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TRANSACTIONS

OF THE

Thirty-third Annual Meeting

OF THE

American Laryngological Association

HELD AT

PHILADELPHIA, PA.

May 29th, 30th and 31st, 1911

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TRANSACTIONS OF THE THIRTY-THIRD ANNUAL MEETING OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

HELD AT PHILADELPHIA, PA.

MAY 29, 30 AND 31, 1911.

THE PRESIDENT'S ADDRESS.

BY D. BRADEN KYLE, M.D.

Fellows of the American Laryngological Association and Guests:

Specialism is not modern. In the days of Hippocrates and Galen it is written: "And they had physicians for the heart, for the lungs, for the entrails, for the stomach and for various parts of the human body," but does not mention any meeting of special societies.

Specialism is looked upon by many as a *one* line in medicine, narrow gauge at that, not even a *double track,* while quite the contrary is true. The specialist must not only have a thorough knowledge, in fact an exact knowledge, of his subject, but in order to have that knowledge he must have a thorough knowledge of general medicine.

We must not deal with the throat, nose and ear in a mechanical way, as if they were detached organs, but must take into general consideration the condition of the individual. This then involves a thorough knowledge of physiology, pathology and applied therapeutics.

Each year new diseases and new classifications are brought forth. But when the condition described is analyzed and placed on a pathological basis, we find that it is an old condition under a new name.

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Various societies have appointed committees on nomenclature. I had the good fortune to be on one of these committees, and in communication with the Health Department of the United States Government I found that it was impossible for us to use the same nomenclature on which their reports are based, for the simple reason that so many of our diseases are not necessarily causes of death, and the Government statistics are only based on diseases which are fatal, so that we have to have a much larger nomenclature than that used by the Government. However, it was agreed that the best, the most rational nomenclature, was that based on the pathological lesion, and that the name applied to the various diseases, serious or non-serious, should be based on the pathological alteration, so that the name used at once indicated to the reader the changes taking place in the structures described.

The combination of the practical physician with the experimental and theoretical is the ideal one, but the busy practitioner does not have sufficient time to carry on experimental investigations. The undergraduate and the post-graduate schools should bear this in mind, and the combination should be taught and neither one neglected for the other. The practical clinical bedside experience can *never be offset* by theoretical and experimental knowledge. The combination of the two certainly makes the great physician.

The same is true in pathology, especially microscopically. The best microscopist and the one whose opinion is valued, is also the practical man who not only sees the tissues under the microscope, but sees the patient and his symptoms macroscopically. He is better able then to weigh all symptoms and signs and is better qualified as a diagnostician and clinician.

The physician who treats only the local lesion and does not investigate for the underlying cause, is certainly not entitled to the name "specialist." He is just a *local* doctor.

It comes within the province of the specialist in diagnosis and treatment to treat the underlying cause. If the individual has a hepatic cough and consults you for relief, *treat the cause.* Otherwise, the specialist would only be a signboard in medicine.

Why is it that the specialist is often considered narrow? Be-

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cause often he is allowed only to treat the local spot, and the correction of the general health of the patient is left to the general practitioner, when in seven out of ten cases the local spot is dependent upon some systemic condition.

Radicalism and conservatism are necessary to any great reform. Both are necessary in medicine, and yet a very good maxim, with which many of us are familiar, is:

> Be not the first by whom the new is tried;
> Nor yet the last to lay the old aside.

In politics I suppose such a person would be called a "middle of the road" man, but it is a good policy in medicine.

One-sidedism in medicine is not limited to the specialist. While it may be more marked in that line, yet we do have the *specialist crank* in the general practitioner ranks. For example, some general practitioners want to explain all our ailments from the uric acid standpoint, while others believe that auto-infection from the intestinal tract is the primary cause of all our diseases; yet it is the fanatic who starts great reforms.

The medical profession must necessarily be opinionated; though not necessarily *self-opinionated* as *individual members.* If such were the case we would be compelled to accept new *dogmas* for *more established facts,* or we would be considered non-progressive. "Modesty is sometimes an exalted pride." "To judge the real importance of an individual one should think of the effect his death would produce."

In medicine we always have the faddist and the radical, but it has always been equally true that we have the conservative, and with every theory the pendulum swings beyond the line, always to be pulled back to the centre by the conservative element.

Much attention has been given to the general subject of medical education and raising the standard of education. In our first-class medical schools the medical education has reached a standard of efficiency. The standard of preparatory education should be raised; in other words, the educational standard of admission to the study of medicine is at fault.

The question of a college degree before studying medicine is an important one. However, it is not always the man with the largest number of titles who knows the most, and such a require-

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ment might deprive well-equipped young men from studying medicine. Instead of only the word "degree," the words "or its equivalent" should be added, so that the individual could have the privilege of examination for admission, as it is knowledge that is wanted, and such an examination will give the individual the privilege of showing whether or not he has such knowledge, even if he has not the degree. It is not the graduate who makes 100 in all branches that makes the best resident or the most successful physician.

The independent medical school that is not connected with a university devotes *all* its time and *energy* to the teaching of medicine, but the independent medical school is handicapped in various States by the fact that many State universities have so arranged their course that the student in four years can receive a college degree; the last two years of his college course is allowed as the *first two years* of his *medical course;* so that by taking two more years he not only receives the college degree, but the degree in medicine. The *independent medical school* requires a man to take four years in medicine. This amounts to *eight years of college study* to take the course in an independent medical school, against six years in a State university. Any practitioner of twenty years' experience would not waste any time in deciding which was the best course to pursue.

There is a vast difference between a medical teacher and a medical lecturer. Every medical lecturer is not gifted with the power of imparting knowledge so that others may receive and retain it, while a teacher has this faculty. Anyone can commit the symptoms of a disease and be able to pass any examination, but would not be able to recognize the malady if they met it face to face; hence, practical teaching must be enforced, and what is needed in our medical schools is more teachers.

Post-graduate work certainly needs some reformation. It is impossible for any practitioner to become thoroughly conversant with any specialty in six weeks' time, and our post-graduate course should be extended over at least six months or a year. Experience crowded into a few weeks does not bring with it *sound judgment* and that *knowledge* which is requisite to recognition of etiological factors and diagnostic symptoms.

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The question of State Board examinations, which concerns us all as teachers, needs our united efforts in regard to State reciprocity, or what would be more ideal would be a Federal Examining Board. As it is now, there is no uniform standard. There has been much agitation on the subject of State Board Medical Bills, in which there is an effort to control all pathies and isms. If we are to control these pathies and isms we necessarily have to recognize them, and by recognizing them we class them as practitioners of medicine. Our own Ex-Governor Stuart showed his wisdom when he signed the Osteopathic bill, in which he inserted the words, "not practising medicine, surgery or therapeutics." In other words, they were not practitioners of medicine, and as one Irish legislator jocosely remarked, "Certainly, they are not doctors, because no one except the regulars, the homeopaths and the eclectics have a right to sign a death certificate." The fact that the law recognizes that medical men are the only ones qualified to deal with life, classifies the isms, the pathies and the faddists. Scientific medicine will always stand against any ism, pathy or faith cure.

The mucous membrane of the upper respiratory tract, like all mucous membrane, is a *dependent* structure—*dependent upon what?* On the *connective tissue*. It is dependent on the circulation and the lymphatics for its nutrition. Therefore, it is a barometer to the system. That being the case, necessarily any systemic disease or condition would be manifested in this sensitive, dependent mucous membrane. This explains why the practitioner of medicine who deals with this particular structure, usually known as a *laryngologist*, should be a *general practitioner*. The fact that a patient has a cough does not necessarily mean that he needs *cough medicine*. The splenic cough, not so frequently seen now, but in the malarial days quite common; the cough due to enlarged liver; the cough due to intestinal conditions or stomach conditions that cause irritation of the diaphragm; the stomach cough; the esophageal cough; the intestinal cough; the systemic cough, due to irritation of the mucous membrane by diseased products thrown out by the secreting glands—all require a different line of treatment. Naturally, if the individual has been coughing for days, weeks or months, the mere act of coughing will produce

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some irritation of the mucous membrane, but remove the cause and the innocent, unoffending mucous membrane will very soon restore itself to normal.

The importance of the examination of the salivary secretions as an aid to diagnosis cannot be overestimated. As you are aware, for the past fifteen years I have been an advocate of this line of investigation. To be sure, in many cases it is only a *negative* aid, but *negative* information is just as important from a diagnostic standpoint as *positive*. It is the unusual cases that the specialist sees, and it is in this particular line of cases that the chemical analysis of the salivary secretion is of the utmost importance from an etiological, diagnostic and treatment standpoint. The peculiar forms of lithemic rhinitis, the colds in the head without any exposure whatever, certain forms of rye fever, rose cold, hay fever, horse fever, the peculiar irritable cases of laryngitis in which the symptoms given by the patient are all out of proportion to the local condition—many of these cases can be worked out on the chemical basis. This is not theoretical, but is practical, as it is demonstrated in many cases in which by the eliminating of the irritant found in these secretions the patient's condition at once returns to normal.

Of the upper respiratory tract the nose and nasopharynx to the junction of the soft palate with the pharynx is an *air* passage, not *fluid*. Beginning with the epiglottis, this air passage continues. Fluids are not intended for these membranes, so that the indiscriminate use of fluids in the nasal passage is contrary to all laws of physiology. If the nasal mucous membrane has *one localized spot* of *irritation*, that *spot* should be treated, but the *entire unoffending* mucous membrane should not be subjected to a fluid bath, by means of the douche or atomizer, simply on account of the offending spot. You might as well put a mustard plaster all over your body for a pain in your side. The use of sprays and astringents in these systemic conditions is too much like *mopping up* the floor, instead of *stopping the leak*, and it is our misfortune to see many of these cases that have been treated locally day after day with no attention whatever paid to the underlying cause. While the atomizer and douche are still used, it is not with that *reckless* frequency as heretofore. It is a well-

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known fact that while much good may be accomplished by their use, yet it is possible by their improper or over-continued use to keep up the very condition you are aiming to relieve.

The important subject of speech development in children has received considerable attention. There is no question of the relation of the voice and hearing to the development of speech. The subjective and objective sense of sound perception is an equally important factor.

The old reliable subject of adenoids, best anesthetic to administer in their removal, etc., still continues to hold its place in medical literature; yet the operation is performed as before, and there is practically nothing new of value. It all depends on the condition of the tonsil, the age of the patient, relation to voice and acoustics, and the common sense of the operator. The *best anesthetic* is a *good anesthetizer.*

Operations on the nasal septum still continue to occupy an important place in the province of nasal surgery. Various new methods have been set forth and old methods defended and priority claimed. In reality, the various operations are only modifications of Adams' original operation. Instruments and devices for the correction of irregularities of the nasal septum still occupy our attention, and no doubt will as long as irregularities of the septum exist. At present the method of correction and instruments for the carrying out of such method are almost as numerous as the varieties of deflection. The old subject of "deflection" cannot be placed under any one heading, and each individual case will demand some special modification, and the successful carrying out of this modification will depend entirely upon the individual operator.

The value of the bronchoscope and esophagoscope, not only as a means of removing foreign bodies, but as an aid to diagnosis and treatment, is of the greatest value, and this Society should be *proud* that we have on our rolls such a man as Chevalier Jackson, whose work in this line stands unequalled. In the diagnosis of laryngeal and tracheal ulcers and various other pathological conditions, these instruments are of the greatest value.

Diagnosis, the keystone of the successful practitioner, based

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on his pathological knowledge and his powers of *observation,* is the *keynote* to the successful treatment of the *individual patient. Experience* can be acquired rapidly, but *experience* without *judgment* often misleads the practitioner, and the patient suffers. *Experience* with *judgment* comes only with *age* and *time.* It is knowing *when* to operate as well as *how.* It is just as *important* to know when to *stop* a medicine as when to give it.

Investigation must and will go on. "The discovery of truth by slow progressive mediation is genius." "Some never think what they say; others never say what they think."

In this progressive age the investigating mind of scientific workers has necessarily increased the fields of observation. Methods of investigation have undergone transformation. Conclusions and generalizations are founded on facts and definite lines of thought. It is this stimulus for investigation that, in order to become highly proficient, necessitates close application to one subject. With the increasing knowledge in medical sciences there comes a necessity of more subdivisions and classifications.

Ross' late work on "The Cellular Theory of Cancer" is of great scientific value, not only from the pathological, but from the therapeutical standpoint. His work has been made possible by one of our American philanthropists, Mr. John H. McFadden, one of the Trustees of Jefferson Medical College, and I certainly would urge the Fellows of this Association to at once make themselves thoroughly acquainted with this work.

The tendency of the medical sciences has been upward. It must necessarily be, for, like everything in nature, when growth ceases it begins to die. The *nearer* we get to nature the more *scientific* we become. The same laws of *chemistry* apply equally to the *clay* and to the *brain.*

In medicine, the true purpose of all research for knowledge is the *preservation* and *prolongation* of life. The increased interest taken in the study of the *natural* and *physical* sciences has had a most valuable indirect influence upon the medical profession.

Geographical pathology plays an important part in medicine, and the meteorological and zymotic conditions influencing epidemics are unquestionable.

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In order to bring about the highest perfection in medical sciences it requires individual *efforts* of *individuals* and the united efforts of *all*. "He who thinks he can do without the world deceives himself; but he who thinks the world cannot do without him is still more in error."

Every practitioner of medicine is aware that much of medicine is not written in our text-books. The effect of the *sympathetic nervous system* on the individual must not be overlooked, as it is the underlying cause of many medical conditions. Shock, worry, homesickness, sorrow, anger, etc., all play an important part, in many individuals, as to an etiological factor in disease.

The successful practitioner in medicine *must* know *human nature*. *This* is just as *important* as to know his anatomy, physiology, pathology and therapeutics.

And now, gentlemen, in our thirty-third annual meeting, in reporting our *failures* and our *successes* and in the *discussion* of these papers, let us not forget that it is very difficult for every individual to see the other's standpoint and view of the subject. Let us be charitable in our criticism and generous in our approval. Let us profit by our *mistakes* and rejoice in each other's *successes*.

In behalf of the Philadelphia members and as your President, we welcome you to the City of Brotherly Love. I now declare the thirty-third annual congress of the American Laryngological Association formally opened.

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THE REGIONAL ANATOMY OF THE UPPER AIR TRACT.

BY PROF. GEORGE M'CLELLAN.

(*By invitation*)

Gentlemen, Members of the American Laryngological Association:

I very much appreciate the compliment paid me by your President in asking me to address you on the anatomy of the region with which you are so familiar.

It would be impossible to go into detail with regard to this region in so short a time, and, therefore, I have ventured to bring before you certain of my free-hand chalk drawings, which were originally made before my classes at Jefferson College.

If you will examine with me this series of drawings you will find that beginning with the opening into the cavity of the mouth and passageways in the nose leading into the larynx and pharynx, there is much that may serve to refresh your memories, even in this brief time which we have to give to the subject. Therefore, before taking up one or two details, or facts, which it has been my opportunity to notice in various dissections of this region, viz., the folds of the mucous membrane peculiarly found in the larynx and oesophagus, and the innervation of the entire region, especially through the branches of the pneumogastric nerves, I will call your attention to the drawings. In these drawings I show you the position of the folds of the mucous membrane. These you naturally find around the fauces, the pillars of which extend from the palate to the tongue, and from the palate to the pharynx, also in different parts of the larynx, as this drawing shows.

I will now point out to you where the folds of the mucous membrane are usually found in relation to the oesophagus. Here I have represented the position of the oesophagus in relation to the vertebral column. You will all remember that the tube be-

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gins at the cricoid cartilage, and then passes down through the posterior mediastinum, and terminates at the oesophageal opening in the stomach. It is about ten inches long. I would like you to recall the arches of the diaphragm; the arch on the right is always higher than on the left, as I show you on this drawing. I want you to notice certain other things at the root of the neck. The trachea comes down in the middle line, in front of the oesophagus, and behind the arch of the aorta divides into the bronchi. On the right side of the body we have the innominate artery, which divides into the subclavian and common carotid arteries. Here, on both sides, we have indicated sections of the common jugular veins with their proper relations to the common carotid arteries; between these we have the pneumogastric nerves. At the root of the neck, on the right side, the pneumogastric nerve comes down between the subclavian artery and vein, or, as sometimes described, between the innominate artery and vein, and then gives off a branch which passes under the subclavian artery, or the innominate artery, and then upward on the side of the neck in a groove between the trachea and oesophagus. That is the recurrent laryngeal nerve. On the left side the pneumogastric nerve descends between the subclavian vein and artery and over the arch of the aorta, under which it sends its recurrent branch up the neck, holding similar relation to those of its fellow. Because of the turning upward of these branches of the pneumogastrics they have been called the "recurrent" nerves. They are the inferior laryngeal nerves, and their recurrent course is to be ascribed to the embryonic changes of the great vessels at the base of the heart, which hook over them and drag them downward in the elongation of the neck during growth.

The oesophagus, as I have reminded you, begins opposite the cricoid cartilage where the pharynx ends, and passes down until it reaches the root of the neck, where it encroaches a little to the left side, and, therefore, it is at this point we have the *first* deviation from a straight line, and consequently a constriction of the oesophagus. Hence it passes, with the trachea in front of it, and owing apparently to the pressure of the arch of the aorta upon the left bronchus, it is pushed over to the right side, where is the *second* deviation and constriction in its course; thence it passes

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gradually to the left, where it enters the stomach, and where is the position of the *third* constriction.

Careful dissections have shown over and over again that there are attachments to the oesophagus and folds within the mucous lining of the tube where these constrictions occur. In passing down the left pneumogastric nerve goes to the front of the stomach, while the right passes behind it. This is due to the gradual turning of the stomach on its axis, because of the alteration in its form from that of the infant to that of the adult. Besides these deviations from the straight line, which occur at the root of the neck, at the arch of the aorta, and at the oesophageal opening in the diaphragm, where the tube ends, it gradually diminishes in calibre all the way down. It should be remembered that in its course it also conforms to the curvature of the thoracic portion of the vertebral column. In relation to the diaphragm, I have found in dissections, and in looking upward from within the stomach into the oesophagus, that it appears funnel shaped, a fold of the mucous membrane always occurring on the *left* side, producing a sort of pocket, and acting, probably, somewhat as the pylorus does at the other end of the stomach, in preventing regurgitation of the contents from the stomach under ordinary conditions.

Notice, please, that the deep cervical fascia passes down through the anterior mediastinum to the diaphragm, and is attached to the pericardium. It keeps the great vessels in their proper relations. The body may undergo any contortion without interfering with the course of the blood into the heart, or out of the heart, by this arrangement of the prolongation of the deep cervical fossia.

To you the changes in the direction of the oesophagus are naturally of the most interesting subjects in the whole of the anatomy of this region. In introducing a probang or tube, it is better to keep it away from the back wall and the left side of the oesophagus, especially at its entrance into the stomach, because of the fold of the mucous mebrane situated at this point.

One word more with regard to the pneumogastric nerves. Those of you who remember the anatomy of these nerves will recall that the jugular foramen is the passageway for what ulti-

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mately becomes the internal jugular vein. Also that at the jugular fossa, where the two portions of the occipital and temporal bones come together, there are found exits from the cranium, for the pneumogastric, the spinal accessory, and the glossopharyngeal nerves. The internal carotid artery is very close (as you will see by referring to this drawing). It is surrounded by a mesh of sympathetic nerves from the upper cervical ganglion. When we examine these parts attentively, the pneumogastric is found to have two ganglia within the jugular fossa—one the ganglion of the root, and the other the ganglion of the trunk of the nerve. The spinal accessory nerve (the accessory portion makes it appear like a spinal nerve) has direct connection with the second swelling, or ganglion of the trunk, of the pneumogastric through the fibres of the accessory portion blending with those of the pneumogastric proper, and becomes an integral part of it, rendering it a most important and interesting nerve. I have already called attention to the recurrent laryngeal nerves. The function of these nerves as regards the laryngeal mucous membrane is interesting from the physiological as well as an anatomical point of view. We are told, and I have told my students, that the recurrent laryngeal nerves pass within the larynx, and supply all the muscles with motive power, except the cricothyroids, which, you know, are innervated by the superior laryngeal nerves. If it be true that the accessory portions of the spinal accessory nerves blend with the pneumogastrics, and especially contribute to the inferior laryngeal nerves, and, therefore, give sensation to the mucous membrane also, what must be the result? That this nerve is capable of producing many of the doubtful phenomena which are so often presented in practice.

Foreign bodies passing into the larynx cause spasmodic cough, but in a very little while the parts accommodate themselves to their presence in an extraordinary way. In my own practice I have had remarkable cases in which the mucous membrane has so accommodated itself. One of these was that in which a piece of evergreen was caught in the fold of the mucous membrane in the neighborhood of the epiglottis, and retained there from the first of January to the first of July, when it was coughed up. Another case was one in which a feather was lodged for eight months in this fold of mucous membrane.

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If I have interested you at all it has no doubt in recalling the deflections from the straight course of the oesophagus and the relations of the pneumogastric nerves. In closing, let me point out that these nerves, particularly in relation to the branching of the bronchi, send meshes of fibres from each side surrounding the roots of the lungs. Again, at the diaphragm, where we have the swelling of the mucous membrane, which I have described, we find meshes of the nerve fibres from the pneumogastrics before they continue through the oesophageal opening in the diaphragm and terminate in the walls of the stomach. The right nerve has connecting fibres which come from the solar plexus.

Discussion of Prof. McClellan's Remarks.

Dr. G. S. Richards: Professor Massei, of Naples, has written many papers upon the subject of the innervation of the larynx. I would like to ask Dr. McClellan if the relation of the pneumogastric to the spinal accessory would explain the occasional irritation which occurs in the parts supplied only through the recurrent.

Dr. George McClellan: Yes. The most recent observers believe that the fibres in the recurrent laryngeal nerves, which furnish sensibility to the mucous membrane of the larynx, are derived from the spinal accessory.

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NASO-PHARYNGEAL FIBROMA.

BY D. BRYSON DELAVAN, M.D.

Until about thirty years ago the removal of the peculiar neoplasm known as naso-pharyngeal fibroma was accomplished by the aid of a preliminary operation, by means of which access was gained to the affected parts. These preliminary operations were of a very serious character, the young patients often dying upon the table from hemorrhage or shock or succumbing later from these causes or from sepsis. About thirty years ago Voltolini, of Breslau, and Rufus P. Lincoln, of New York, substituted for these methods certain plans of treatment by electrical methods used through the natural passages. The result of this discovery marked a brilliant epoch in the history of the treatment of this particular condition.

Before, the statistics were absolutely bad. The mortality rate was appalling and severe hemorrhage and prompt recurrence of the tumor the rule. By the electrical methods all of these evils were banished. For a while the new treatment met with great favor. Of late years it has largely fallen into disuse.

Indeed, at a symposium held during the past year in France and representing some of the best surgical talent in that part of Europe, those discussing the subject seemed unanimously to favor preliminary operation. Many leading surgeons in England and many more on the Continent of Europe and in the United States still advocate these obsolete methods. In view of this, it has seemed right to again call attention to the work of Voltolini and Lincoln. The papers of both of these authorities ably set forth the means by which the electric current may be used in these cases and the results which they obtained in the actual treatment of the cases.

In the volume of our Transactions for 1901 I published a thesis upon the subject which embraced a résumé of the literature to date. Two years later I made an additional contribution upon the same subject, hoping that the statistics given and

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the facts deduced from a broad and comprehensive study of the matter would impel those interested to depart from the ancient and thoroughly discredited methods of procedure and to adopt the newer and more brilliant electrical methods.

In the ten years that have passed since my last paper the treatment of these cases has seemed to revert to the old methods. I have, therefore, thought it desirable to again bring the subject before you. I have had an exhaustive resume made of the literature of the subject, with results most disappointing from every point of view. The reporting of the histories of cases is as bad as ever. In a few instances are such details given as make it possible to gain any definite information as to the actual history, and in almost no case are the final results reported. This latter would imply that, as a rule, the results have been unfavorable.

Again, the number of cases reported in which the electric current has been used is exceedingly small in comparison with what might be expected, and the records given of severe, dangerous and deforming preliminary operations employed show that the general ignorance upon this subject is almost beyond belief.

Thus Bond (Proceedings Royal Society of Medicine, 1908-9) reports a case in which he removed a large naso-pharyngeal fibroma from a boy of seventeen, after first having performed tracheotomy, removed the ascending process of the superior maxilla and the front of the antrum, also nearly all of the right alveolus. No subsequent history is given of this case.

Viannay (Loire Medicale, St. Etienne, 1907-26-417) reports that he removed a naso-pharyngeal fibroma from a boy sixteen, first having ligated the carotid, resected the superior maxilla and part of the anterior floor of the base of the skull. The operation was followed by severe hemorrhage and some shock. As is often the fact in such histories the case is reported as having been discharged "cured" on the thirteenth day.

Tilley, in a boy of fourteen, performed four operations; at the first he divided the nasal bone and removed the growth with forceps. There was profound hemorrhage. At the second operation, after a preliminary tracheotomy, the soft palate was

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completely divided, the hard palate removed by chisel and mallet and the recurring growth taken away by scissors, snare and forceps. It recurred in three weeks. A third operation was a repetition of the second with recurrence in one month. On the fourth occasion the septal cartilage was divided, the front wall of the left maxillary bone and the ascending process of the maxillary bone were removed and the growth then taken away by scissors and forceps. Hemorrhage followed. There was no recurrence within three months. The patient was therefore reported "well."

Stewart (Homeopathic Eye, Ear and Throat Transactions April, 1900) attempted to remove a naso-pharyngeal fibroma from a female child by means of "Burns'" operation and the cold wire snare. Following this, he applied the *actual* cautery. The only note given following the history of the operation is "Hemorrhage—Death."

These few instances suggest first the absolute lack of knowledge shown by many operators of this type of case. Again they show the wretched manner in which reports of such cases are made. Nor is bad history writing confined to this country. Some of the worst instances are to be found in foreign literature, especially the German.

From the above, it would seem that the conditions obtaining at present are but a repetition of the discreditable history of the past. It would appear that many men absolutely refuse to inform themselves as to what has been done in times past and, thus insisting upon the old methods, the progress of surgical science is retarded and continued injustice wrought.

On the other hand such men as Ruprecht, Tomassi and Woods believe that a large majority of these growths can be treated by electric or galvano-caustic methods and that operation through the natural passages is entirely feasible. They strongly deprecate preliminary operation.

Considering that Woods reports six cases cured by this means, his opinion at least should be entitled to consideration.

The chief aim of the Voltolini method was to do away with the highly objectionable preliminary operation. Incidentally, however, several other advantages of importance to the success

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of the operation were gained. Its principal features may be summarized as follows:

1. Departing entirely from former usage, Voltolini reached the site of the tumor through the natural passages.

2. In suitable cases his first attempt was to reduce the size and vascularity of the growth by means of electrolysis, applied as near as possible at its base.

3. In finally removing the growth he surrounded its base with the loop of a galvanocaustic ecraseur.

4. He succeeded in causing the loop of the ecraseur to pass in all cases entirely through the base of the growth, controlling its progress at will.

5. By the use of the incandescent wire, properly regulated, hemorrhage was in many cases absolutely done away with. Where it occurred the amount of blood lost was trivial.

6. The cauterant action of the loop was not limited to the tumor itself. The base of the growth was deeply affected by it, and remnants of diseased tissue were so completely destroyed as in many cases to render its removal radical and complete.

The advantages of the operation above described are obvious and most important.

1. The dangerous preliminary operation was made unnecessary. The patient was therefore saved the shock and hemorrhage resulting from it, and during the performance of the operation the surgeon was saved much valuable loss of time to the patient and the expenditure of energy and responsibility to himself.

The secondary and the ultimate results of the preliminary operation were abolished, and, what was of great importance, subsequent local treatment of the base of the growth was, if necessary, made easily possible through the natural passages. Hitherto recurrence had in many cases required a repetition of the preliminary operation, with all of its distressing effects upon a patient already demoralized by disease, suffering and by the disappointment of former failure.

2. Instead of tearing away piecemeal or otherwise forcibly removing the tumor through the natural passages as at present practised by Doyen and other French surgeons, the galvano-

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caustic loop was carried to its base, and thus the least amount of injury was done the highly vascular tissue of the growth itself while the division of the pedicle was effected as near as possible to healthy tissue. This point is important when the vascularity of the growths in question on the one hand and their tendency to recurrence on the other is remembered. While excellent *final* results have been gained through the natural passages by the process of evulsion, by forceps or by removal with the curette or the cold snare, it is expressly stated in a number of reports of such operations that "hemorrhage was severe." My own experience corroborates this.

3. By reason of the large amounts of fibrous tissue contained in the growths under discussion their division is a matter of peculiar difficulty. The ordinary cold wire loop is commonly of insufficient strength to pass through them, while the ecraseurs of the type used for ordinary nasal operations are not to be considered. The attempted use of such inadequate means will generally be followed either by breaking of the wire, refusal of the screw of the instrument to advance, or by severe injury to the ecraseur itself. When the latter consists in splitting of the end of the cannula by the wire the situation becomes one of serious danger to the patient, as the advance of the screw causes the free end of the cannula to be thrust indefinitely forward, to the peril of the adjacent parts.

In reviewing our tables, the truth of the statements already made regarding the statistics of this subject will be apparent. Altogether the most striking fact which they convey is that in the reporting of cases even the most eminent surgeons are often guilty of great carelessness. In the series before us this feature is a lamentable one. From the cases here tabulated much might have been learned if each operator had clearly stated the whole truth.

Moreover such statements as:

"Operation successful;" "Patient made good recovery;" "Well in two weeks;" "Scar imperceptible;" "Results excellent," and the like not only teach nothing as to the ultimate outcome of the case, but lay the reporter open to at least a suspicion as to his good faith. For, unfortunately, there seems to be an in-

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evitable tendency to the suppression of bad results. The published cases taken as they occur, scattered here and there in literature, are apt to represent the better side of a given operation. How many failures the reporter may have had he does not state and it seems to be requiring too much to expect that he will.

The disease naso-pharyngeal fibroma is relatively rare. In the aggregate, however, a large number of patients have been operated upon in all parts of the civilized world, and our leading surgeons have it in their power to publish collections of cases, the combined results of which would be of the highest value. The same is true of the surgeons of other countries, notably of England.

It is impossible ever to establish the truth until all of the facts are at hand. But as it is chimerical to hope that all operators will report all of their cases, the safe course for the statistician would seem to lie in the suggestion that in dealing with this work only the operations of men who have reported all of their cases, good and bad alike, should be considered.

Whatever else may be shown by our statistics, they certainly prove that even the most severe cases clinically are amenable to treatment by the natural passages. In support of this statement the late Dr. Stokes, of Ireland, in discussing a case in which a large tumor had been removed by the above method, said: "Some years ago a growth of this sort would have been removed only after serious intervention." Doyen says: "I have never seen a naso-pharyngeal fibroma which could not be removed through the natural passages." Certainly no testimony could be stronger than this latter statement, coming as it does from a Parisian, a thorough surgeon, and a man of exceptional experience.

It may justly be said that since the days of the older French surgeons great advances have been made in surgical technique, and that operations then dangerous and severe have been deprived of most of their terrors; that antisepsis and better methods of operation and of after-care have vastly improved the percentage of success in this particular class of cases.

The statistics of twenty years ago show a much higher rate of mortality than those of to-day. The statistics of operation

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through the natural passages, however, show practically no mortality at all.

Even if the results of preliminary intervention were to become equally good with those obtained by the method of Doyen, the latter would still have far greater advantage in that by it preliminary operation is altogether avoided. What shall be said, then, of the pre-eminent value of the Voltolini method by which the disadvantages of both the ancient method and that of Doyen are completely overcome? The theoretical advantages of the Voltolini method are obvious, and its absolute superiority would be established if it were proved equally successful with other plans of treatment. As a matter of fact, our statistics show it to be actually superior. Why, then, have the electrical methods not become more universally accepted, in view of their brilliant results?

Several possible explanations may be given in answer to this question somewhere among which the truth is likely to be found.

1. Adherence to tradition. This begets in the surgeon an unwillingness to accept innovation, partly through a conscientious desire to deal as far as possible with certainties in the management of his patient, avoiding on the one hand the appearance of rashness and on the other employing the means with which he is the most familiar and partly through a genuine and sometimes unfortunate lack of personal independence. Thus the pupils of many of the originators of special surgical procedures have too often been content to follow their distinguished leader, without the fair exercise of their own good judgment, thus retarding true scientific progress.

2. There can be no question that in the successful management of the electrical method the operator must possess an extraordinary degree of special skill. Moreover, he must not only be most expert in the manipulation of the instruments used in the nasal and pharyngeal cavities, but also an accomplished surgeon and a good anatomist. The success obtained by Voltolini and Lincoln was doubtless largely due to their unexampled dexterity, as well as to their possession of the other qualifications mentioned.

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3. General unfamiliarity with electrical therapeutics is another reason why Voltolini's views were not at first received with greater enthusiasm, and while the knowledge of this department of science has in recent years become widely diffused, the teachings of Voltolini have meanwhile passed from public view.

4. In certain cases it has been found difficult to gain the patient's continued approval of electrolysis, both by reason of the pain caused by it and by the occasional slowness of its action. While general anaesthesia in every way facilitates the removal of a growth by means of the galvano-caustic loop in the application of electrolysis it has not generally been employed. In the experience of myself and many others this objection has sometimes proved a serious one.

The discovery of a relatively painless method of applying electrolysis is very desirable.

It will be noted that in the number of electrolytic applications required to effect a cure great disparity exists. This may be due (1) to the peculiar structure of the growth as well as to its relative size. (2) To the manner in which the electrical current is applied. More careful observations are needed to show under what conditions of vascularity and development of the growth the method is likely to prove most successful. The same is true with regard to the technical management of the current. In the recording of successful cases the details of this feature cannot be too minutely and fully set down.

A number of cases have been reported within a few years past in which successful results have followed the use of various chemicals injected into the substance of the growth. Ingals, of Chicago, was among the first to study and employ this method. Harmon Smith has also reported cases. A careful trial of it seems justified by the success which has attended its use. Again, certain instances have been reported in which disappearance of the growth has been spontaneous. This latter phenomenon emphasizes the fact that naso-pharyngeal fibroma is generally, although not always, slow in its growth, and that it tends to disappear after a certain age. The acceptance of this well-known fact makes it necessary to admit that in some cases at least rash surgical intervention is not only dangerous but absolutely un-

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necessary. Since attempts at the removal of the growth at one time and by severe measures are almost sure to be followed by recurrence the best results are likely to be obtaind by more patient methods.

Nine years ago I wrote as follows: "The result of these researches has been most satisfactory, for it has established the much disputed fact that the treatment of naso-pharyngeal fibromata, formerly considered to be in the exclusive province of the surgeon, is no longer justifiable by means of the formidable preliminary operations heretofore practised. Contrasting the rate of mortality of the cases so operated upon with a record of the cases without a single death, and comparing the other features of the statistics of the two classes of operation, such as hemorrhage, recurrence, and injury to the parts, it will be seen that the new methods have achieved a triumph so signal as to place them beyond the reach of further criticism or opposition, and that the teachings of Voltolini and Lincoln have been completely vindicated."

My present review of the work of the past eleven years fully corroborates the above statements. Indeed, there seems little new to be added to the subject. The best that can be done is to emphasize the points already advanced, and by an accumulation of testimony to place upon an impregnable basis the fact that preliminary operation is not necessary, that it is highly dangerous, and that its results cannot for a moment compare with those of operative procedures of the proper kind through the natural passages.

Electrical methods may indeed require greater skill and considerably more patience, but their vast superiority has now been abundantly established.

The writer has attempted to collect the literature of the subject for the last ten years, supplementary to his statistical record of ten years ago. Very few reported cases are of use, owing to lack of accuracy and of details. The accompanying tables, therefore, can only be relied upon to give an approximate idea of actual results. Whatever their shortcomings, however, they abundantly prove the danger of the old methods and the brilliant advantages of the new.

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TABLE A.—Fragmentary Report of Cases Classified According to Variety of Operation.

METHOD	No. of Cases	Hemorrhage	Shock	Recurrence	Cured	Improved	Died
Severe preliminary operation	14	6	4	3	1	.....	1
Nasal Route (preliminary)	8	6	.....	2	1	.....	.....
Nasal Route (with tracheotomy	2	2	.....	2	.....	.....	.....
Torsion of base of growth	1	1	.....	.....	.....	.....	.....
Cold ecraseur	10	9	.....	.....	.....	.....	.....
Cold ecraseur (with actual cautery)	1	1	.....	.....	.....	.....	1
Avulsion (forceps, scraping, etc)	21	18	2	1	3	.....	.....
Electrolysis	2	.....	.....	.....	1	1	.....
Galvano-puncture	1	.....	.....	.....	1	.....	.....
Galvano-cautery	3	2	.....	.....	1	.....	.....
Galvano-caustic loop	12	.....	.....	.....	8	.....	.....
Injections (mono-chlor. acet. acid	2	.....	.....	.....	1	1	.....
Injections (iron and arsenic)	1	.....	.....	.....	.....	1	.....
No treatment	2	.....	.....	.....	1	1	.....

TABLE B.—Represents the Various Operations Collected in Groups.

	No. of Cases	Hemorrhage	Shock	Recurrence	Death	Cure	Improved
Severe prelim. op. : avulsion:	47	32	6	8	1	5	.....
Nasal Route	.....	68%	12.75%	16.8%	.....	10.64%	.....
Cold snare	10	9	.....	.....	.....	.....	.....
Electrolysis : galvano punct :	15	.....	.....	.....	.....	11	.....
Galvano-caust. loop	.....	.....	.....	.....	.....	73%	.....
Injections	3	.....	.....	.....	.....	1	2
	.....	.....	.....	.....	.....	33.3%	66.6%
No treatment	2	.....	.....	.....	.....	1	1
Cold snare (actual cautery)	1	1	.....	.....	1	.....	.....

Total cases. . .83 | Male. . .72 | Female. . .8 | Not reported. . .3 Average age . .17 ½ yrs.

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Discussion on Paper of Dr. D. Bryson Delavan.

Dr. J. Price Brown: I have reported to this Association on different occasions a number of cases as sarcoma of the nose. They were reported as sarcomata by my pathologists, who were good men in their line of work. The hemorrhages that occurred also indicated that they were sarcomata; but they compared very closely to the conditions reported by Dr. Pierce in his paper yesterday, for in ever case the growth filled the nasal passage and also the nasopharynx. If these cases were really fibromata instead of sarcomata the results would equally support Dr. Delavan's suggestion of treatment. They were exceedingly hemorrhagic and exceedingly large. I showed a case to this Association eight years ago with the pathological specimens. I said at the time that the passage into the nose after removal of the growth was so large that any recurrence of the disease could easily be reached by the electrocautery. It continued to recur over and over again and was always burned down wherever it occurred. It did not confine itself to the nasopharynx and the back portion of the nose, but affected the soft palate also. I operated as required until three years and two months ago, when the last cauterization was done. The man is now perfectly healthy and lives in Toronto. Two years ago in Boston I read a paper on sarcoma of a similar character occurring in three other cases. These patients were then just completing the treatment; I said that I believed there would be recurrence, and there was. Operations were continued when required, and all are seemingly well men to-day. The effect of the cautery on the deep tissues is that of singeing. It produces coagulation of the blood plasma external to the part operated on. Last April, in one case the middle turbinate became so involved that I wished to remove the turbinal bone itself. This had to be done under an anesthetic, the hemorrhage was exceedingly severe and the patient almost bled to death. Tampons were inserted, but the bleeding continued; so on the third day he was put on the operating table and the corresponding common carotid tied. The impression is that if this is done it will check the growth of these sarcomas. In this case it stopped the hemorrhage, but after the tampons were removed I was required to continue to operate until three months ago.

Dr. Harmon Smith: Six years ago I reported a case of post nasal fibroma including the entire posterior nares, reduced by the injection of monochloracetic acid, beginning with 3 mm. and running up to 5 mm. I have seen the case at intervals of a year since then, and there has been no recurrence. Since that time in my clinic I have seen two other cases so treated, both successfully.

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Fig. 1.

Photographs of patients taken in April, 1911. They are identical with Nos. 6 and 7 in a paper read upon "Sarcoma of the Nose" at the meeting of the association in Boston, 1909. After that date there were many recurrences in each, which were relieved as before by electro-cautery operations. In April, 1910, the left common carotid was tied in the patient to the left when in a state of collapse from excessive hemorrhage. After recovery the operations were continued. Both men, for some months, have been free from further recurrence. They are working full time as city street car conductors.

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Dr. C. R. Holmes: I wish to call your attention to, and advise you to try, if you have not already done so, the methods of Dr. G. Betton, of Philadelphia, for malignant growths. That is by means of the mercury points; you can use it either by the unipolar or bipolar method. By the latter you can use a very strong current, up to 2,500 milleamperes. By the unipolar method you can use from 500 to 700 milleamperes. Eight years ago I operated on a case of spindle cell sarcoma, involving the tonsil and the upper posterior part of the tongue, after the surgeons said there was only one way to do—extirpate the larynx. Another case three years ago with the involvement of the soft and hard palates. Both these patients are still to-day without recurrence. I have a patient at present where I went up to 2,500 milleamperes. To my mind this would be an ideal thing to use in these fibrous tumors of the nose and pharynx, because you can put it through the nares and reach the site of the nutritive vessels. I mention this because it does not seem that this method has been used very much, excepting in gynecology, but I know from practical experience that it can be used to very great advantage in nasopharyngeal work.

Dr. A. W. Watson: I am in accord with Mr. Delavan in regard to the method of treatment of these cases. Some years ago I had a case of rather extensive fibroma of the nose and nasopharynx. The case has never been published, and therefore I would add it to those already collected by Dr. Delavan as having been treated by electrolysis.

The patient was a man about twenty years of age. The growth originated, as usual, at the vault of the pharynx, and the main growth was so large as to fill the nasopharynx and extend downward into the oropharynx, pushing the palate forward. When it was removed it measured six inches in circumference and two inches in depth. The growth also extended forward along the septum on both sides and protruded from the anterior nares. There was also a tumor on the left cheek which must have extended through the antrum. In the beginning the main growth and the two prolongations into the nares were removed by the galvano-cautery snare, the snare being carried through the nares. The hemorrhage was practically nothing. Recurrence, or rather increase in size, went on. I attempted on a good many occasions to remove portions of the growth by forceps, but these attempts were attended by considerable hemorrhage and made no difference in the size of the growth. I then tried electrolysis, one needle in front and the other in the growth in the nasopharynx. This treatment was kept up for several weeks, every other day. I found that the patient could

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not stand more than from five to ten milleamperes. I do not see how Dr. Holmes can use in the nose, a current as strong as 2,500 milleamperes. Shortly after using electrolysis the condition began to improve, and after about four weeks was sufficiently improved to allow the patient to return to his home in the country. A few weeks later he wrote that he was still improving. Later he came to see me again, when I applied the treatment for a week more, and he then returned to his work, that of a teacher. Subsequently each report from him was more favorable. He was breathing perfectly through the nose, the growth on the cheek had disappeared, and when I last heard from him he considered himself perfectly well.

Dr. D. Bryson Delavan (in closing): In my student days it was my good fortune to see several of the cases treated by the late Dr. Rufus P. Lincoln. All treated by the method of electrolysis and by the use of the galvano-caustic loop and all were cured. Since that time these methods have been used by many other surgeons, both in this country and abroad, with results which abundantly prove their value.

In spite of this the highly unscientific methods of severe surgical intervention are still extensively practised. One has only to study the statistics of the two general methods to realize at once that in the light of our present knowledge extensive preliminary operation is unnecessary, dangerous and ineffective. On the other hand removal of naso-pharyngeal fibroma through the natural passage is devoid of danger and far more certain of expecting a final cure.

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EPIGLOTTIDECTOMY—THE RATIONAL TREATMENT OF EPIGLOTTIDEAN TUBERCULOSIS

BY LORENZO B. LOCKARD, M.D.

The operation of epiglottidectomy has now been performed in a series of cases sufficiently large and varied to permit of certain definite deductions and recommendations unwarranted in the author's previous reports.

The earlier operations of this nature were performed upon patients with such extensive involvement of both lungs and larynx that hope of any effect beyond temporary local palliation could not be entertained, yet the results achieved were occasionally of so remarkable a nature that the scope of the operation has been gradually extended, until to-day it is undertaken almost as frequently for the cure as for the relief of the local disease.

Tuberculosis of the epiglottis is universally recognized to be the most fatal as well as the most painful laryngeal localization of the disease, the odynophagia itself being responsible, in great degree, for the high mortality.

It is extremely rare that this focus is an isolated one, the preponderating majority being associated with, and secondary to, lesions of the lungs and of other segments of the larynx, lesions not infrequently incipient or quiescent until aroused into activity by the development of this complicating process. Particularly does this result ensue when true odynophagia has supervened.

The general futility of treatment in such cases has become a truism; when there is only circumscribed ulceration or filtration medicinal treatment and curettage may effect an occasional cure, but when the process has advanced to widespread ulceration or massive infiltration such methods are usually worse than valueless, for they are not only ineffective in practically all cases, but the persistence of the odynophagia during this probationary

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period rapidly destroys the vitality so essential to ultimate recovery.

Even when the odynophagia is temporarily relieved by such methods as the injection of alcohol into the internal branch of the superior laryngeal nerve, or the sub-mucous injection of novocain or alypin, the basic process itself, if advanced, remains uninfluenced, and there usually persists sufficient dysphagia to seriously interfere with proper alimentation.

The injection of alcohol is infinitely more painful than the complete removal of the diseased organ, and while the former simply subdues the pain for a short period, the latter does it more effectively and permanently, at least that part due to the epiglottidean involvement, and at the same time exercises a distinctly curative effect, not upon this one focus alone, but upon the complicating laryngeal lesions as well.

As a purely palliative procedure, in advanced cases, its worth has been repeatedly proved. Of 151 cases, capable of exact analysis and accurately observed, the pain was relieved in 127, or 84.10 per cent.

There were 16 cases that would have been classed as favorable if the epiglottis had not been involved, and of these 100 per cent. were completely relieved; 95 would have been considered hopeless even without the epiglottidean disease and 88 of these were benefited to such an extent that both liquid and solid food could be swallowed with comfort. Of 40 additional cases, impossible of exact classification, 25 were permanently relieved of pain.

In further explanation of these statistics may I be permitted to quote briefly from a previous paper?

In considering these figures allowance must be made for two sources of error; in the first place, in a small number of cases, after varying periods of relief, some pain recurred owing to progression of complicating laryngeal lesions, and on the other hand, some cases benefited to a considerable degree were not classed as successful, for I have attempted to tabulate as relieved those only in whom no dysphagia persisted.

In many instances complete relief, as a result of this single procedure, cannot be hoped for, additional measures directed to accompanying lesions being frequently demanded, but it is a

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matter of constant surprise to witness the complete disappearance of the dynophagia, even when all other parts of the larynx are extensively ulcerated and infiltrated. A striking example—though a necessarily unusual one—of such an outcome is found in the subjoined case of which photographic reproductions of the larynx and amputated epiglottis are shown in Figs. 1 and 2.

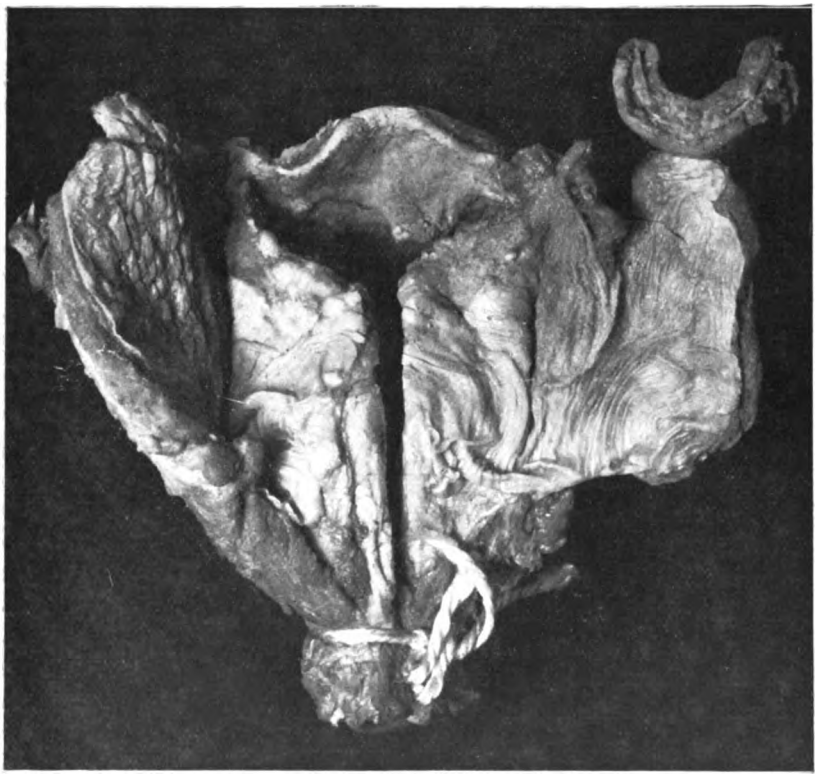

Fig. 1.

Extensive tuberculosis of the larynx. Two-thirds of epiglottis removed, with immediate, complete and permanent relief of pain. In six weeks the diameter of the stump receded from 11 mm. to 2 mm., at the end of which time microscopic examination failed to reveal any evidence of tuberculosis.

This patient, a man of 42 years, had extensive disease of both lungs and the entire larynx. The epiglottis was very thick and dotted with numerous deep ulcers on the laryngeal surface, the

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free edge and left side of the lingual surface. Slightly below and to the left of the petiolus was a mass of granulation tissue as large as a filbert. Both aryepiglottic folds, arytenoid cartilages and vocal cords were ulcerated throughout, and the ventricular bands were infiltrated and ulcerated, altogether as unpromising a case as could be imagined. Odynophagia and dysphagia were of the severest type, and amputation was reluctantly performed in the hope that the almost intolerable pain might perhaps be somewhat lessened. Despite every apparent reason to the contrary, relief was immediate, complete and permanent, and to the time of death (six weeks later) deglutition was painless and normal, except for an occasional attack of coughing due to the almost complete destruction of all parts governing laryngeal closure. Microscopic examination showed extensive necrosis of the arytenoids.

Both lateral margins of the stump were perfectly healed and normal; in the centre only was there some remaining infiltration.

This result was especially surprising in view of the fact that no attempt had been made to remove the entire organ, and the line of incision did not go as far as the lowermost ulcers.

Microscopic examination of a segment excised from the stump after death failed to show any evidence of tuberculosis. The specimen had the characteristics of diffuse adenoid tissue, with considerable fibrous tissue interspersed.

The chief purport of this paper, however, is not to direct attention anew to the palliative value of the procedure, although the relief of pain is necessarily the first desideratum, but to present the results in those cases in which the operation was undertaken chiefly with a view of attaining local cure. Preliminary to this report a brief review of the normal and pathological anatomy is essential, in order to show the reasons for the futility of the usual methods of treatment and the rationale of radical intervention.

The epiglottis is composed of a thin lamella of fibro-elastic cartilage, pitted on its lower surface with numerous depressions for the lodgment of mucous glands and blood vessels, and covered by a thick perichondrium: a sheath composed of fibrillar connective tissue which blends without distinct demarcation with the superficial layers of the cartilage.

The mucous membrane throughout is of the stratified squa-

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mous type; on the lingual surface it is separated from the cartilage by a wide stratum of areolar tissue, but on the laryngeal side it adheres so closely to the perichondrium that it is difficult to separate. On the inferior portion of the laryngeal surface the

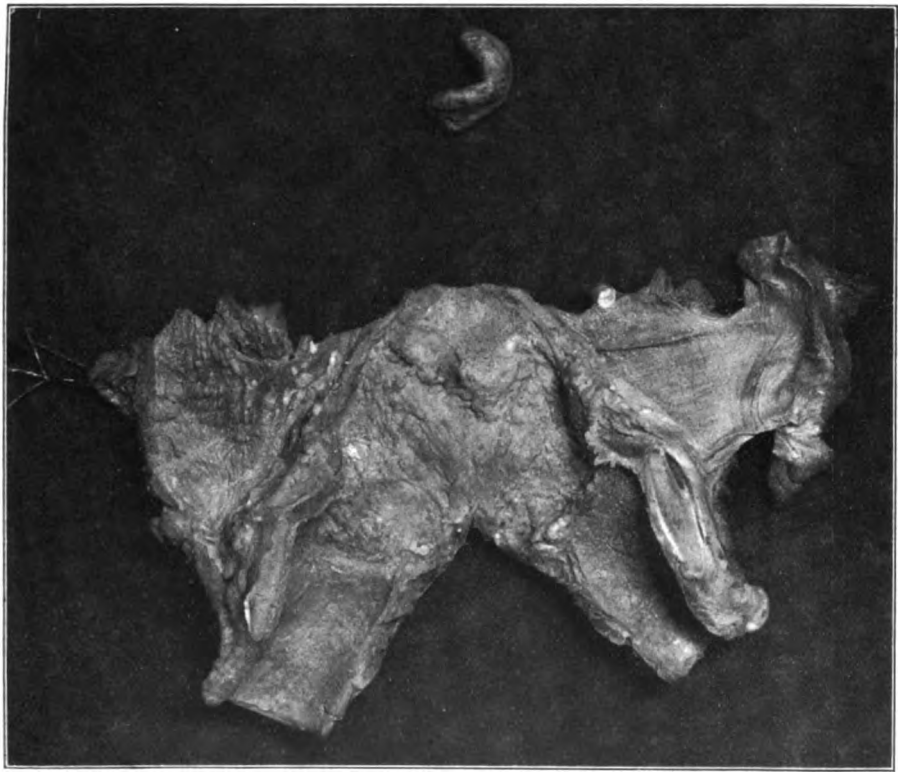

Fig. 2.

Interior view of larynx pictured in Fig. 1, showing necrosis of the arytenoid cartilages, destruction of the vocal cords and ventricular bands, infiltration of the aryteno-epiglottidean folds, and large mass of granulation tissue on the anterior wall.

mucous membrane contains so many lymphoid cells that it assumes the character of diffuse adenoid tissue, and in spots they are so grouped as to form distinct nodules. It is at these points the earliest epiglottidean foci would be expected to occur, a sup-

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position supported by clinical and pathological observations. In only very exceptional instances, however, are specimens obtained at a stage of the infection sufficiently incipient to positively demonstrate this point.

In two specimens, not showing other involvement of the epiglottis, the area about the tuberculum was infiltrated, and in several additional cases the tubercles at this point were the only ones with central degeneration.

An interesting and important fact in anatomy is that the cartilage is not composed of a single plate, but of several segments, usually three, each perfectly enveloped by periosteum, the dividing trabeculae containing blood vessels and occasionally mucous glands at either extremity. Masses of fatty tissue also extend part way in between the segments. (Figs. 12 and 13.) The significance of this conformation will be shown in discussing the pathology.

The irregular structure of the organ explains several of the conditions found in tuberculosis.

Macroscopically it is seen that the cartilage seldom lies in the mesial plane, one side practically always being more infiltrated than the other: in incipient cases the process may be limited to the laryngeal surface, but when the disease is far, or even moderately, advanced, the lingual side is nearly always the thicker. (Figs. 3, 7, 8 and 9. Fig. 9 is reversed in the illustration.)

This condition was present in 18 of the author's last 20 cases.

Besold and Gidionsen claim that the laryngeal surface is the more infiltrated in every case, but that there are exceptions is shown by Fig. 4.

As a corollary, the laryngeal surface is the one upon which ulceration soonest and most often occurs, for the tubercles, in the confined area between the epithelium and cartilage, soon destroy the blood vessels, with resultant degeneration and destruction of the epithelial surface.

The oral surface, on the other hand, rarely becomes ulcerated until the infiltrate has attained massive proportions, unless through direct extension from the free border. (Figs. 4, 5, 6 and 10.)

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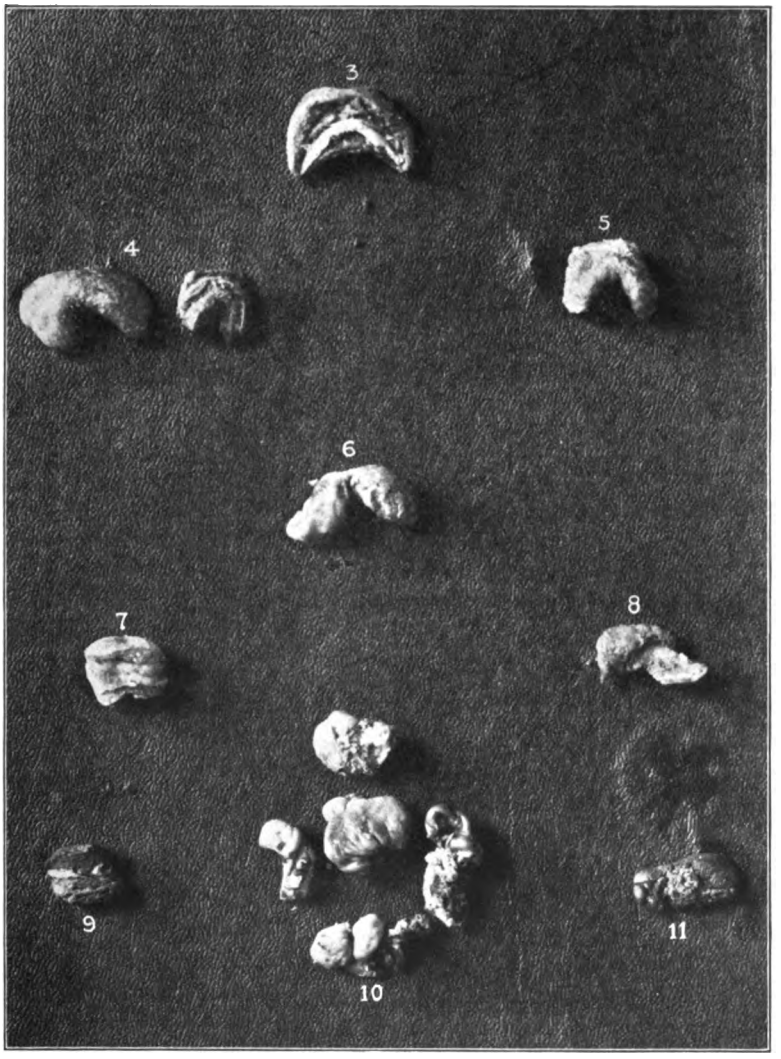

Figs. 3 to 11.

Figs. 3, 7, 8 and 9. Massive infiltration of the lingual surface of the epiglottis.

Fig. 4. The rare condition of greater infiltration of the laryngeal as compared with the lingual surface of the epiglottis.

Figs. 4, 5, 6 and 10. Ulceration of the lingual surface of the epiglottis.

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Pathology.

The investigations of the author have led him to views at variance with those held by other writers on tuberculosis, in so far as they concern three vital points, i. e., the origin, frequency and nature of perichondritis and cartilage necrosis.

It is commonly held that these complications are exceedingly rare, and that even when the perichondrium is extensively involved the cartilage itself usually escapes.

It is also maintained that these conditions, when existent, are the consequence of extensive and deep ulceration, and almost never result from an inclosed infiltrate.

Hajek has condemned the use of the term "tuberculous perichondritis" on the ground that the process is due entirely to the entrance of the germs of suppuration through an epithelium previously destroyed by tuberculosis, and Besold and Gidionsen, while advancing the claim that a true tuberculous perichondritis and chondritis have been shown to exist, concede that the causative factor may be a preceding purulent inflammation which breaks through and into these structures and thus prepares the way for a later involvement by the tuberculous disease. They admit, however, the rare development of a primary tuberculous process.

These desiderata are of the utmost importance in their bearing upon treatment, hence extensive investigations were made to determine both the frequency and true nature of each process.

In all 41 tuberculous epiglottides were examined, and the sections embraced the entire organ whether or not macroscopic evidence of universal disease presented.

Of the 41 specimens, 25 were ulcerative and 16 purely infiltrative; of the ulcerative cases the lingual surface was involved in five. In 24 of the 41 specimens the perichondrium was invaded, either extensively or of one or more circumscribed areas, and in 15 of the cases of perichondrial disease the cartilage was affected.

Thus 58.52 per cent. of the cases had perichondritis, and 36.58 per cent. of the entire number, and 62.5 per cent. of the peri-

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chondrial cases showed evidence of either beginning or extensive cartilaginous involvement.

The discrepancy between these findings and those of other investigators is very great and is not susceptible of adequate explanation. It may depend on the fact that the deeper extensions are usually of microscopic foci, and that in consequence a large number of sections may be examined without un-

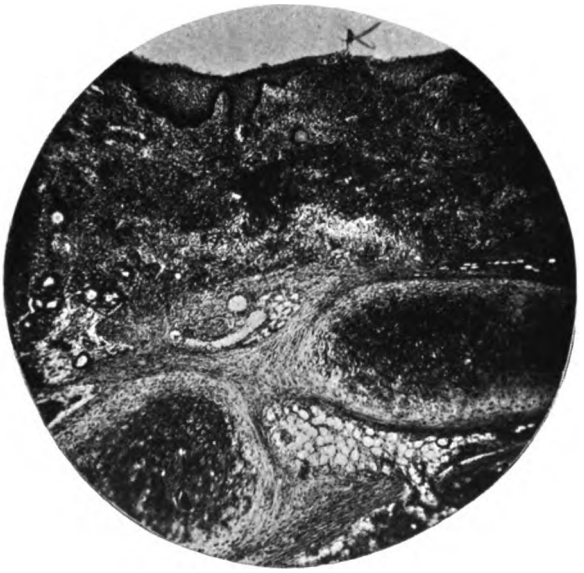

Fig. 12.

Submucous infiltrate of the epiglottis. Normal segmentation of the cartilage.

covering the affected part: in this series the entire organ was examined, and in many of the specimens the deeper involvements were discovered only upon prolonged search.

The fact remains that in these cases both perichondritis and necrosis of the cartilage were of frequent occurrence, and that in eight of the specimens they were not the result of ulceration, but an accompaniment of a purely infiltrative process.

The latter is a fact of great importance, for it shows that no

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definite indication of the condition of the perichondrium is to be gained from a naked eye examination.

One case in which a clinical diagnosis of necrosis had been made owing to exposure of the cartilage along the free edge, and two in which the existence of perichondritis seemed probable because of the rapid spread of massive infiltration and edema, were found normal on microscopic examination.

As already described, both the cartilage and its sheath were found involved in a number of specimens that macroscopically appeared to be but superficially involved.

Although a rapidly developing edema is highly suggestive, actual destruction of the organ, either as a whole or of certain segments, is the only infallible sign.

The process in the perichondrium varied within wide extremes. The greater number of the specimens showed only circumscribed points of cellular infiltration, these areas sometimes containing definite tubercles and giant cells. In others almost the entire sheath was invaded and thickened, frequently to several times the normal diameter. (Figs. 14 and 15.)

In some instances the periosteum was lifted up from the cartilage and the fibres separated into irregular layers—a condition most probably due to a mixed infection following ulceration of the epithelial surface, as every case with this condition was an ulcerative one. This type corresponds to that described by Hajek and others, and is evidently the only form observed by them. Despite their claim that all cartilaginous foci originate in this manner, it can be positively affirmed that there is another form, of equal frequency, primary in nature, that is purely tuberculous. In such cases the infection may be due either to a hematogenous invasion or extension from adjacent tissues.

A complete break in the periosteum through which the tuberculous granulation tissue extends into the cartilage is shown in Figs. 14 and 16. A like condition was present in three other cases, in none of which was there epithelial ulceration.

The view is also tenable that in some cases we have to do with a purely degenerative process, due to complete obliteration of the nutrient vessels.

In 15 cases there was cartilage necrosis. The process in the

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cartilage generally involved microscopic foci only, showing the inherent resistance of the cartilage to the disease. In seven cases there were either multiple points of necrosis or single foci of large size, the granulation tissue, in the latter cases, occupying the entire width of the cartilage. Such a condition is shown in Figs. 13, 15 and 17.

In nine of the specimens, in which perichondritis was found, the interchondral trabeculæ were also invaded. The entire

Fig. 13.

Tuberculosis of the epiglottis. Granulation tissue pushing through the perichondrium, with beginning necrosis. Interacinous infiltrate on the laryngeal surface. Normal segmentation of the cartilage.

trabecula was occasionally involved, the infiltrate passing through from one surface to the opposite one, the first focus usually appearing upon the laryngeal surface. The mucous glands, sometimes found at the extremities of the trabeculæ, were distorted by an interacinous infiltrate, and the blood vessels were often either partially or entirely destroyed. In most instances the infiltrate extended only as far as the layer of fatty tissue.

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This condition, together with the dilated vessels so frequently found in the layer of tissue immediately below the tubercle zone, offers a valid explanation of the rapidity with which epiglottidean foci usually extend.

When these pathological changes are considered; the extensive infiltration of the entire submucosa; the obliteration of blood vessels and glands; the infiltration and, perhaps, detachment of the perichondrium; the involvement of the interchondral trabeculæ; the frequent areas of necrosis in the cartilage, and the common destruction of the epithelium, the reasons for the futility of topical applications are manifest. It is highly improbable that such tissue can undergo resolution; even when the process does become quiescent it still exists, and at any moment may be aroused into renewed activity.

To accomplish healing the parts must be given absolute rest, that is, totally deprived of function, hence the rationale of amputation. It has been proven that complete extirpation of the diseased tissue is not essential, although it materially shortens the period of healing.

Even when universally involved, removal of the greater portion results in rapid recession of the disease in the stump.

Not being a vital organ no argument against removal can stand unless it can be shown that it does not exercise a curative and palliative influence, that the wound fails to cicatrize, or that the operation leads to further infections.

Statistics bearing upon these questions are limited, for there are recorded a few cases only, aside from those of the author, in which the operation was performed for other than purely palliative purposes.

In October, 1909, the author published the following analysis of all such cases then available: (a) Cases favorable aside from the epiglottidean involvement, 11; epiglottis healed, 11; larynx healed, 8; still under treatment, 3.

Of the three cases then under observation, one recovered; one is improved both as to the lungs and larynx; and one succumbed to the pulmonary disease, but the larynx had steadily improved.

In this series, then, there is a percentage of 100 as regards

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healing of the epiglottis, and of 81.8 in cures of the larynx.

Of these cases one has now been cured seven years; one, six years and two months; one, five years; three, between three and four years; four, between two and three years, and one, twenty months.

(b) In the second class, cases considered unfavorable apart

Fig. 14.

Submucous tubercles of the epiglottis and normal epithelium. A large tubercle is seen invading the perichondrium. The central portion of the cartilage is necrosed.

from the epiglottidean focus, there were 70 of complete healing of the epiglottis out of 83 operated, but in only three of these did the disease in the larynx entirely disappear.

(c) Of 40 unclassified cases the epiglottis cicatrized perfectly in 25, the larynx in eight.

The entire 134, including the cases not then classed as successful, give the following results: Epiglottis healed, 107, or 79.85 per cent.; larynx healed, 20, or 14.92 per cent.

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Except in a few cases it is impossible to give definite data regarding the permanence of healing, for most cases soon pass from observation, but certain it is that the larger number sooner or later relapse in so far as the larynx is concerned. The epiglottis itself seldom shows a recurrence.

Of 20 additional cases, operated since the last report, the epiglottis was permanently healed in 17. One case, relieved of

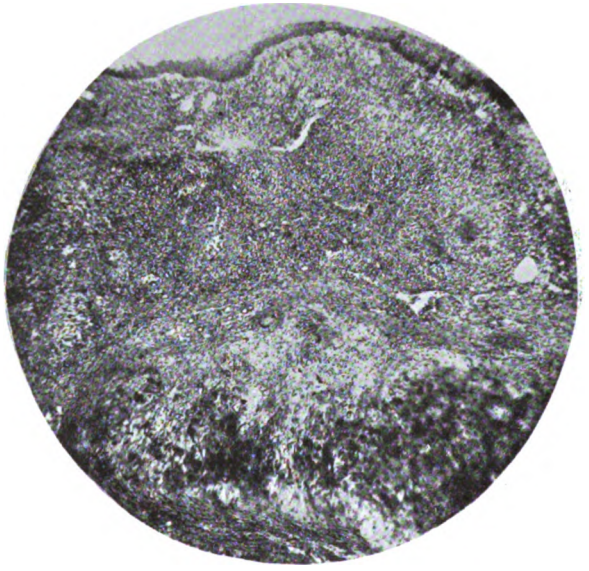

Fig. 15.

Extensive tuberculosis of the epiglottis, showing typical disease of the perichondrium and cartilage. The epithelium is normal.

pain, returned to his home while there was yet an unhealed spot; one in whom there was concomitant pharyngeal ulceration had a recurrence in the stump after five weeks, and the third had a return of infiltration on the left side after eight months, when a second operation was performed. At the time of the first operation almost the entire larynx was affected; when the stump was again operated, the disease had practically disappeared on the right, but on the left side the arytenoid and aryteno-

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epiglottidean fold were still greatly infiltrated. Several months later Dr. Gleitsman subjected these points to electric puncture with considerable benefit, since when the larynx has remained quiescent despite rapid progression of the pulmonary lesions. (This patient died on March the second of the present year, two years after the primary operation of tuberculous broncho-pneumonia.)

Fig. 16.

Tuberculous granulation tissue in the perichondrium, with necrosis of the underlying portion of the cartilage.

In this series, embracing several cases admittedly unfavorable to operative intervention, we can claim a definite percentage of 85 in cures of the epiglottis, and in two additional cases the stump has given no subjective symptoms. In nine of the 20 cases the larynx definitely improved.

Additional data can be adduced in refutation of the arguments that surgery must be ineffective because it cannot thoroughly eradicate the disease, and that further infection is favored by the opening up of the lymphatics.

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Theoretically these objections are valid, but practical experience demonstrates their fallacy.

It is rare that the line of inicision in epiglottidectomy passes beneath the invaded tissues, yet the stump practically always cicatrizes, and, regardless of its preceding amount of infiltration, recedes rapidly to normal.

This point is beautifully demonstrated by a comparison of the stump with the excised segment shown in Figs. 1 and 2. In a period of six weeks, during which practically no treatment was given, the diameter of the stump diminished from 8 to 2 mm. at the centre, and from 7 to 1 mm. at the margins, at the end of which time microscopic examination proved the disease to have completely disappeared.

In a patient now under observation, operated February 8th, the stump has contracted from 11 mm. to approximately 2 mm. Six weeks later the right arytenoid and aryteno-epiglottidean fold were removed. In both instances healing was prompt, although the patient was placed under the most unfavorable of conditions. Because of advanced kidney disease, the urine, loaded with hyaline and granular casts, amounting to but 25 ounces, he was confined to bed, given an exclusive milk diet, and received 64 steam baths in 16 days.

Of 47 personal cases the stump healed perfectly in 40; in seven there was delayed healing, and in only three was there recurrence.

In 44 additional cases, collected from various sources, local healing occurred in all but two.

A total of 154 cases show the following results:

Epiglottis healed, 124—80.51 per cent.; larynx healed, 29—18.83 per cent.

The larger number of those recorded as unhealed concerned patients upon whom purely palliative operations were performed, and in whom death occurred before sufficient time for cicatrization had elapsed.

In not one of the author's 47 cases was there any recognizable unfavorable effect exerted either upon the lungs or larynx, and of 213 cases reported to him in personal communications, there was not a single instance of metastasis.

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The claim is not made that the removal of this focus exerts a direct curative influence upon the larynx as a whole, but the assertion is warranted that a distinctly favorable effect is indirectly produced.

This betterment depends upon a number of factors: (1) A focus is removed that seriously interferes with correct treat-

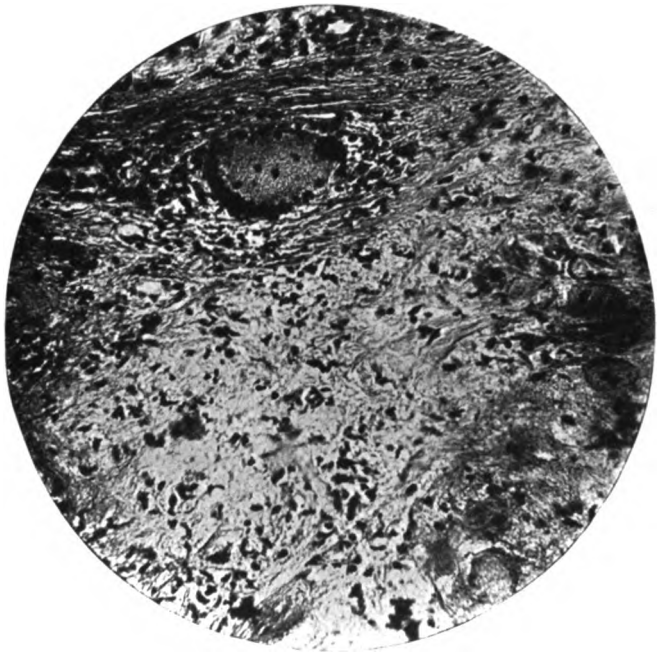

Fig. 17.

Tuberculosis of the perichondrium and cartilage. Almost the entire cartilage is replaced by tuberculous granulation tissue.
High power of Fig. 15.

ment of underlying lesions; (2) the danger of extension by continuity is lessened; (3) cough and excretion of mucous are greatly decreased; (4) rest, both local and general, gained through the relief of pain, together with the resumption of normal feeding, result in a marked increase of vitality and consequent greater responsiveness to treatment; (5) marked subsidence of neighboring changes of a simply inflammatory nature.

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These statistics, limited though they be, warrant the unequivocal assertion that amputation should be performed in every case of involvement regardless of the extent of the disease, local or constitutional, when odynophagia or dysphagia exists and can be ascribed, even though only in part, to the epiglottis; that it is likewise indicated, and should be performed at the earliest possible moment, in every case where there is anything beyond a sharply circumscribed focus, whether or not odynophagia exists, provided there is even a remote possibility of arrest of the complicating lesions. If the accompanying processes are advanced to a stage where arrest is improbable, amputation should not be performed unless the lesion gives rise to otherwise uncontrollable pain.

Some few cases, even of widespread involvement, will recover spontaneously or by reason of less radical treatment, but for every one so saved 10 or 12 will succumb. Epiglottidectomy will save that one as well as an occasional case from among those who otherwise would die and, in addition, will free practically all from the most harassing feature of the disease, the well-nigh intolerably odynophagia.

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SYPHILIS OF THE LARYNX.

BY GEORGE C. STOUT, M.D.

Otologist and Laryngologist to the Presbyterian Hospital, Philadelphia, Etc.

(*For The American Laryngological Association, May,* 1911.)

Syphilis is found in the larynx with great frequency. It may occur as the inherited variety, or may be a secondary or tertiary manifestation of the acquired form. We know that the three stages of Ricord are arbitrary, and that the apparent intervals dividing the stages do not coincide with the arrests in the progress of the disease, which is persistent from the incipiency of the primary sore to the end of the process. Even the apparent periods of rest between the stages are most irregular in duration. oftentimes one stage overlapping another, the secondary and tertiary co-existing in the same case. Moreover, in lesions of the upper respiratory tract, it is frequently impossible for the most experienced observer to differentiate between the so-called secondary and tertiary manifestations.

The appearance of the syphilitic lesions in the nose, throat and mouth are protean; they are almost limitless in variety, and their character and extent are limited only by the anatomical peculiarities of the neighborhood in which they are found.

Pathologically these manifestations in the respiratory tract, as elsewhere, are always due to round-celled (embryonic) infiltration; they are inflammatory and of perivascular origin. In other words, in all of the lesions there is the occurrence of more or less circumscribed tissue formed of small round cells, or larger polyhedral cells, with occasional giant cells. In the tertiary form the same conditions hold, excepting that they are more intense and include perivascular cell changes and irritative processes, which at times result in the development of fibrous connective tissue, and at other times eventuate into degenerative changes (coagula-

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tion necrosis), with resulting deformities from the destruction of tissue and from the formation of scar tissue.

Primary Type.—So far as I know, no case of primary lesion of the larnyx or trachea has been recorded.

Secondary Type.—Secondary lesions are not often found primarily in the larnyx, but when present they occur more often on the epiglottis, or aryepiglottic folds, and on the true vocal cords respectively. The erythematous stage of syphilis in the larnyx is not characteristic, but resembles a marked subacute laryngitis, although at times the process may proceed to the formation of whitish superficial ulcerations, usually symmetrical, on the false or true vocal cords, the condition then closely resembling a pneumococcic or tubercular membrane in the larynx, and the clinical history and therapeutic test may be necessary to establish the diagnosis. Mucous patches proper and condylomata rarely occur in the larynx.

Tertiary Type.—The tertiary lesions of the larynx are numerous and serious, occurring with far greater frequency than the secondaries, and their early diagnosis is of prime importance in order to prevent the most extensive lesions and deformities, and at times, in the malignant or fulminating varieties of syphilis, the deformities come on with surprising rapidity in spite of the most radical treatment at the hands of the best syphilologists. As an illustration of this may be cited the case of Mr. F, thirty-five years of age, a robust man, who placed himself under the care of one of the ablest syphilologists in Europe within two weeks of the appearance of the primary lesion, and vigorous anti-syphilitic treatment was instituted at once. In spite of this there was extensive phagadenic ulceration in the neighborhood of the original lesion, both alae of the nose disappeared, there was perforative ulceration of the septum, severe syphiloderma, leaving marked scars on the face; entire destruction of the free portion of the epiglottis; and marked laryngeal stenosis and fibrosis; all having occurred within a few months of the primary lesion. This patient came under my care after these extensive lesions had occurred. His was one of those exceptional cases in which the tertiary lesions are encountered early in the first year of infection.

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Tertiary lesions may occur at any time, from a few weeks after the primary infection to fifty years thereafter, although most frequently from one to three years. They often coexist with the secondary lesions.

In the tertiary lesions in the larynx we have the breaking down of the round-celled infiltration, causing necrosis, ulcers, and the consequent scar-tissue deformities and stenosis. There is rarely hemorrhage in specific lesions of the larynx, although there may be an edema proving suddenly fatal. As in the upper portion of the tract, the breaking down process may begin on the surface of the membrane and work down to the deeper parts, or it may begin in the deeper layer and work upward to the surface. Here, too, perichondritis may come on later, and may be the result of specific infection, but is probably more often due to coccic infection entering through superficial syphilitic ulcerations. The resulting scar tissue is prone to contract, giving rise to serious deformities and stenosis, to which may be added that caused by necrosis of the laryngeal or tracheal cartilages, with or without sequestra, and from the ulcerative processes there may be perforations between the esophagus and the trachea. At times there is paralysis of the vocal cords, due to (1) the infiltration extending to the vocal cords themselves; (2) pressure on the recurrent laryngeal nerves by the round-celled infiltration; or (3) rigidity of the cricoarytenoid joint from cicatricial contraction, and hoarseness may result from any of these conditions. Gummata seem to have a special predilection for the epiglottis, while specific perichondritis seems to prefer the arytenoid and cricoid cartilages.

In certain patients who are apparently otherwise cured of their syphilis (and this particularly in alcoholics) the vocal cords are often thick, red, puffy, relaxed or flabby, and not readily controlled by volition, making the speaking voice hoarse and rasping and the singing voice entirely inoperative; a condition exceedingly difficult to improve by either internal or local treatment. I have frequently seen this condition, although it seems to have escaped the notice of, or to have been thought unworthy of report by other men.

Papillomata are at times met with in these syphilitic larynges.

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sometimes sessile, sometimes pedunculated, and at times they are as dense in structure as tendon, and most difficult to remove.

Often the epiglottis is entirely destroyed without any inconvenience of the patient. In these cases it is only rare that small ulcers on the edge of the epiglottis are painful upon deglutition. In some cases the laryngeal stenosis seems to be due to diffuse fibrosis of the larynx (another condition which rarely seems to be mentioned by writers), which in appearance in the laryngoscope resembles a general round-celled infiltration of the mucous membrane, but which is hard and precludes the introduction of the smallest intubation tubes.

The tertiary manifestations in the larynx at times resemble tuberculosis, carcinoma, or lupus, and here the clinical history or the therapeutic test, as well as the microscope, are necessary to clear the diagnosis.

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A case illustrating this general fibrosis of the larynx is that of Mr. P., who suffered from a malignant form of syphilis. When I first saw him, six years ago, the epiglottis had been entirely destroyed by a necrotic condition, and the larynx was much stenosed. While the false cords were visible, the landmarks were hard to differentiate on account of the general thickening of the laryngeal mucous membrane. The larynx was so small that it was impossible to introduce the smallest O'Dwyer tube. This patient was unable to take the iodids for any length of time, even in the smallest doses. His other syphilitic manifestations disappeared after inunctions of mercury and iothion, but the fibrosis of the larynx seemed slowly to progress. Later on both false cords were practically destroyed by the actual cautery, very cleverly applied by Dr. Schmidtheusen, of Aix-la-Chapelle, but after the lapse of another year the larynx closed up entirely, and a rapid tracheotomy was necessary. Here the scar tissue was hard and resistent. Mercury, administered in large doses hypodermatically and by frequent inunctions, together with iothion inunctions and iodid of potash to his limit, had no effect whatever on the laryngeal stenosis, and the patient was obliged to wear the tube until the time of his death five years after it was first introduced.

The deformity resulting from cicatricial tissue in these cases is often of a most severe degree, the epiglottis being tied down to the pharyngeal wall, at times to the aryepiglottidean folds, or to the base of the tongue, or the epiglottis may be quickly melted

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away, as in the case just cited, or the general lining may assume a dense, fibrous, tendon-like character, all these cases necessitating a low tracheotomy.

Inherited Type.—The inherited specific lesions of the larynx may occur early, at the ages of five or six months, or after puberty. According to John Mackenzie they occur with far greater frequency at the earlier ages; but the cases of this group which I have encountered were mostly late cases coming on after puberty.

Diagnosis.—The early erythematous conditions are sometimes difficult to recognize, but in the advanced stages specific lesions of the larynx are not hard to differentiate as a rule.

The history given by the patient is of less value in these cases than in any other disease, partly because of ignorance, in cases which have been innocently acquired (of which there are not a few), and partly from false modesty. In this connection my custom is to suspect every one, irrespective of social conditions, religion or age. Far more cases of syphilis are innocently and ignorantly acquired than most of us dream. It has been estimated that 10 per cent. of the inhabitants of the United States have a specific taint, and these cases are met with in the practice of the laryngologist with greater frequency than in that of any other class of physicians, possibly excepting the genito-urinary men.

The peculiar brick-red aureola over the soft palate, which Seiler regarded as pathognomonic of syphilis, has not been generally accepted. When mucous patches are found in the mouth or pharynx the diagnosis is unmistakable, even in the absence of other manifestations or history. The pearly-gray ulcers, resembling nitrate of silver applications, on the mucous membranes. which are obstinate, not often painful, symmetrical or not, under or upon the tongue, inside the lips and cheeks, or upon the tonsils or pharynx, and sometimes extending over the epiglottis, are almost unmistakable to the trained eye, and when accompanied by secondary lesions elsewhere they make the diagnosis positive.

So with the tertiary symptoms. The rounded, smooth gummata are readily diagnosed by their appearance, the clinical history of lesions elsewhere, and the therapeutic test. In the later destructive stages syphilis may resemble tuberculosis, Vincent's ulcera-

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tion, post-exanthematous or post-diphtheritic ulcerations, or possibly pemphigus, lupus, or carcinoma, even before they are broken down, and especially so when the tonsils or lateral pharyngeal walls are involved. Fortunately the microscope may be called to our assistance in eliminating the fusiform bacillus, or the spirillum of Vincent's angina, and the tubercle bacillus, or in discovering the spirillum of Schaudin, and is often decisive in these conditions.

In one case of tubercular ulceration of the upper border of the epiglottis, before the days of the Wassermann test, the presence of tubercle bacilli and the absence of any syphilitic lesions or their sequellæ rendered early diagnosis positive. This case ultimately died of tuberculosis. The clinical history usually clears the way for the diagnosis of syphilis, even if the landmarks are few, while, on the contrary, syphilis can rarely be eliminated by exclusion. As an illustration of these cases where the landmarks are very meagre. I may quote the case of a police officer whose only symptom was a marked palmar specific syphiloderm which cleared up the diagnosis of a tumor the size of a hazelnut, situated in the median line of the soft palate, which promptly melted away under anti-syphilitic treatment. In this case the specific history was denied absolutely.

I have seen at least four cases of cancer of the larynx which were most difficult to differentiate from syphilis. All were seen at a late stage, prior to our knowledge of the Wassermann test, and all required long, careful observation before the diagnosis could be established. At times cancer coexists with, or follows syphilitic lesions of the throat.

If the spirochæte of Schaudin and Hoffmann are found they assure the diagnosis, but their absence does not prove the contrary. So, too, the Wassermann test is of value in obscure cases, or in cases where the lesions cannot be readily reached, and these may show positive years after active manifestations have disappeared. The therapeutic test, however, together with the clinical history, may still be regarded as our most reliable means of diagnosis in the great majority of cases. In connection with the therapeutic test it must be remembered that certain exceptional cases, apparently nonspecific, can take tremendous doses

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of iodids, while others, undoubtedly specific, do not bear mercury or the iodids at all well.

The greatest difficulties in differential diagnosis probably lie between specific conditions, chronic catarrhal laryngitis, tuberculosis and carcinoma. In the early stages, if the appearance of the larynx alone is considered, the differential diagnosis is especially difficult. Minor, of Asheville, N. C., has written a very comprehensive paper on the early diagnosis of tuberculosis of the larynx, but I feel sure that, even with his wide experience, he will admit that some cases of catarrhal laryngitis show a laryngeal image very similar to those he describes as the early tubercular manifestations, and that so also do the early larynges of syphilis. It is therefore often necessary to look beyond these appearances for our diagnosis.

The voice, while hoarse in cancer, tuberculosis or syphilis, is usually stronger in syphilis or cancer than in tuberculosis. The pain experienced is usually most severe in malignant disease of the larynx, less so in tuberculosis, and least in syphilis. The enlarged lymph glands in cancer are often especially painful.

The laryngeal speculæ of Jackson or Ingals are sometimes useful in doubtful tertiary cases, both in diagnosis and treatment. Specific ulcerations are most apt to be clear-cut and deep, spreading deeply, crater-like, dirty gray, with marked inflammatory redness around them; while tubercular ulcerations are more apt to be flat, lateral-spreading superficial, slightly grayish, somewhat painful, and surrounded by redness, but more often by pale gray discolorations.

In the absence of positive blood tests the diagnosis is often most difficult, as, for example, the case of Mr. H. S., who presented himself to me for examination in December, 1910. Mr. S. was a ring-master in a circus, and in the summer of 1905 he was thrown from a horse, sustaining a fracture of the skull. Four years later he lost his voice, and was informed (according to his statement) by two laryngologists, that this loss of voice was due to the injury which he had sustained when thrown from the horse and the paralysis resulting therefrom. There was rigidity of the right vocal cord, marked swelling over this right cord posteriorly, some swelling in the interarytenoid space, some under

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the left ventricular bend, resembling the so-called hernia of the ventricle. No general evidences of syphilis were found. The original diagnosis of paralysis from traumatism was probably made before these growths were manifested. The patient's age eliminated carcinoma, and his general appearance and condition, together with the absence of tubercle bacilli in his sputum, eliminated tuberculosis, and a diagnosis of syphilis was made and borne out by the therapeutic test. Here, however, one can see how, in the early stages, the paralysis of the vocal cord might have been attributed to the cerebral lesion.

Cracks and fissures at the angle of the mouth are suspicious. Smooth red patches on the tongue, appearing as if shaven, and bleeding readily, are occasionally found, later becoming deep ulcerations covered with a yellowish film.

Treatment.—We can add very little to the general treatment of syphilis of the upper respiratory tract, which is the same as that of syphilis of any other portion of the body. Mercury is the drug which cures the toxemia, and is to be used in the early stages, while the iodids should be used in the later stages. their particular function apparently being to dispose of the lesions While every physician knows that these are the remedies to be applied in cases of syphilis, there is probably no disease more often improperly treated than syphilis. In other words, the dosages are not properly applied to given cases. Mercury should be administered to the limit of endurance at first, and later in tonic doses, with periods of rest from treatment. In the later stages the iodids should be pushed to the limit, so long as there is a lesion present. Patients who cannot bear mercury readily when taken by the stomach, should be given inunctions or hypodermics. Inunctions of mercury are a more efficient method of treatment than the use of this drug by the mouth, but they are so filthy as to be distasteful to private patients, as a rule. In Aachen, or the Hot Springs of Arkansas, they remain the favorite remedy, because, when taken in connection with the baths and their accompaniments, they are relieved of their apparent uncleanliness.

For quick and positive results in the more severe types of laryngeal syphilis deep intramuscular hypodermic injections of mercury are unqualifiedly the most efficient means we have at

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hand, unless we except "606." Hypodermics of bichlorid, in doses varying from a third of a grain down (depending on the symptoms, the urgency for quick results and the general physique of the patient) are, in my experience, surpassed by no other salts of mercury. I prefer giving them in the gluteal, or belly, muscles, thrusting the syringe in to the depth of about one inch, either using a gold needle, or throwing away the needle after each application. The frequency of the hypodermics is to be governed by the conditions, varying from every other day to once weekly. I have had a few cases complain bitterly of the after-pain from the patient), are, in my experience, surpassed by no other salts of the pain following its various substitutes. Hypodermics are contra-indicated in children and pregnant women.

Mercury should be given until the disease is controlled, or to the limit of endurance, after which, as stated above, the dose may be cut in half, and tonic doses given, with periods of rest, for three years. Should its prolonged use cause a general physical depression, it should be withdrawn for a time, and hygienic measures and tonics substituted for it. Salivation is more likely to occur during the first course of mercury, but usually the symptoms begin to disappear before salivation develops.

While mercury probably causes fatty degeneration of the specific cells, its action is markedly aided by the administration of the iodids, which latter may be given in Fairchild's essence of pepsin, water or milk, half an hour after meals in increasing doses to the limit of tolerance. The longer the interval between the time of infection and the introduction of the treatment, the better the result will be from the use of iodids in combination with mercury.

Such cases as have an idiosyncrasy for the iodids are most trying in our work. Some of them will take large doses of the tincture of iodid internally with good results, a form of treatment much used in Aachen. In some of these cases inunctions of iothion or iodon in lanolin (25%) are sometimes well borne. In malignant syphilis, or recurrent active syphilis, or in cases which have an idiosyncrasy for mercury or the iodids, or that do not respond to the latter, "606" should be tried. This remedy has the advantage that it may be given to children a few weeks old, and during pregnancy; while it is contraindicated in cases

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of organic heart disease, or in vascular disease; in retinal, or optic nerve diseases, when they are not specific in origin; in lung diseases, excepting tuberculosis; non-specific nephritis; constitutional diseases; and fevers or advanced diseases of the brain and spinal cord.

In a certain percentage of cases of syphilis the chief point of attack is the larynx. In this group of cases there are many pa-

Fig. 1.

tients whose very existence centers about the upper respiratory tract. Their mental, psychical, as well as physical, lives are, as it were, swayed by the happenings in this region. Such cases belong essentially to the laryngologist, whose familiarity with the anatomy and physiology of this region, together with his mechanical skill, are often taxed to the utmost.

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Local Treatment.—Strict, non-irritative antisepsis, supplemented by antiseptic powders (of which iodoform is the best, but also the most unpleasant) is indicated. The free use of iodon powders on ulcerations that previously have been carefully cleansed has met with most favorable results in my hands. The erythematous conditions, gummata, or general round-cell infiltration, are aided by the local application of the official yellow oxid of mercury, mercurial ointment, or iothion ointment. For ulcerations 10% chromic acid, iodoform and bismuth, iodon, iothion, sulphate of zinc, nitrate of silver, mercurial ointment, yellow oxid ointment, all have their uses after the ulcers have been cleansed with peroxid of hydrogen. In certain cases of indolent ulcerations 10% chromic or 25% nitrate of silver are efficient. They should, however, be used only with the greatest care and in selected cases.

Intubation.—In a small percentage of cases intubation is indicated. In many of the cases of cicatricial stenosis, and in the cases of general fibrosis of the larynx, however, it is impossible to introduce even the smallest sized intubation tube. When possible to introduce these tubes they aid materially in overcoming the stenosis by pressure. In one case in which it was impossible to introduce the ordinary O'Dwyer tube, I had a tube constructed of spiral silver wire (see Fig. 1), and was able to introduce it by means of a stiff laryngeal applicator passed into the tube, the flexibility of the latter admitting of its assuming any required shape.

In a certain percentage of these cases the stenosis is rapid and extreme; in others there seems to be a general round-celled infiltration of the mucous membrane lining the larynx; and in still a few others there is a general *specific fibrosis* of the larynx, the lumen being infringed upon, or closed throughout its entire length down to a small aperture, so that there may be a sudden total closure from edema, or swelling from acute inflammation. This has occurred in a number of my cases, as it has been my experience that these cases of specific stenosis do not accede readily to advice for tracheotomy until the latest possible moment. In three such cases I have been obliged to do a rapid tracheotomy, without time for anesthesia, although the tracheotomy had

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been impending under my observation over a period of from one week to many months. In these cases all preparations for tracheotomy should be made before starting the anesthesia, as the larynx usually closes entirely after the first whiff of ether, and the operation must be done instantly, using a curved bistoury. It is in such cases that the trachea is liable to be entered to one side of the median line on account of the distortion caused by efforts at breathing.

Laryngeal stenosis seems to have a peculiar psychical effect upon the patients. I have seen two patients who suddenly became insane, and in whom there had apparently been no central lesions to account for this occurrence. One of these threw himself out of a third-story window before his condition was known.

When feasible I do a low tracheotomy, and as the tubes often remain in situ over a long period of time, it is well to have tubes of various sizes, both as to length and diameter, so that they may be alternated every few days. The larger sizes conformable with the size of the trachea are the best.

Complications.—The complications arising in these long-standing tracheotomy cases are many, and often tax one's skill to the utmost. In one case (Mr. P., who wore a tube for a period of six years) there occurred (1) an *induration around the orifice* of the neck wound, which was keloid-like, and had a strong tendency to contract and force the tube out of the median line; the contraction finally becoming so great as to cause pressure ulceration around the tube, which gave excessive pain. I temporarily overcame this by making four radial incisions equidistant around the rim, extending through the hardened mass to a depth of three-quarters of an inch. The induration rapidly reformed, however, extending out from the edge of the orifice to a distance of half an inch to an inch at different points laterally, and extending anteriorly in knob-like masses for half an inch. This formed a smooth, non-ulcerative, tendon-like aureola. Later it became necessary at intervals of about six weeks to dissect out this entire ring of hardened tissue, making a large, crater-like opening which, in six weeks or three months' time, would again fill up, and the process of its removal would have to be repeated.

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(2) Occasionally *ulcerations* occur around the orifice, but they yield promptly to one of the already mentioned applications.

(3) *Ulcerations* at the *inner end* of the *tube* yield to the mercurial ointments, powdered calomel, iodoform, nitrate of silver, or 10% chromic acid.

(4) *Recurring granulations* at the extremity of the tube, or in the upper tube fenestra, organized at times, require removal at frequent intervals, in some cases. In one case these neoplasms were of a dense fibroid consistency.

Fig. 2.

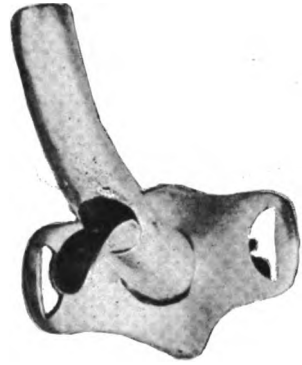

Fig. 3.

In another case (Mr. F.) there was a strong tendency to a (5) *circular stenosis* just below the inner tube mouth, in spite of the fact that tubes of varying lengths were introduced. It was finally overcome by the use of the lobster-tail tube shown in Fig. 2.

In another of my cases the tracheotomy tube (6) was forced half an inch to one side of the median line by a *keratous growth* around the outside of the neck wound, and in another case it was forced well to one side by the growth of papillomata in the trachea.

(7) Granulomata about the tube-end may be removed by the

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various devices of Schrötter, Krauss, Seiler, etc., familiar to us all. In one of my cases, however, these growths were so tough as to require bone-cutting forceps to remove them.

In one tracheotomy case (8) a *deep erythematous rash* occurred around the tube after each application of iodoform. In

Fig. 4.

Fig. 5.

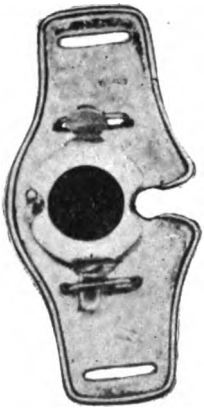

Fig. 6.

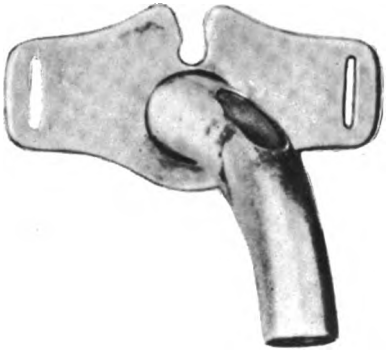

Fig. 7.

Fig. 8.

still another case (9) an *abscess* formed outside of the tube, about half an inch between the surface of the neck and the trachea, which had to be opened in the tubal canal. I have met with (10) *pockets* along the tube canal from such abscesses in two cases. In one case, who had an idiosyncrasy for the iodids but who had taken over three hundred inunctions of mercury,

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there was (11) a *rapid crosion* between the posterior pharyngeal wall and the esophagus at the fundus of the tube canal. Fortunately this was tiny, and healed under a scab after the application of silver and iodoform.

The *laryngeal stenosis* can, of course, be much more easily treated after tracheotomy has been done. Among the many schemes tried as aids to this end are the following: (1) The modified tube, shown in Fig. 3, was used in one of my cases. A firm rubber tube, such as is used in lavage, was introduced through this tube-mouth, and guided up into the larynx from below, by means of the guide shown in the cut, an opening being made in the rubber tube to permit the passage of air for breathing purposes. Constant elastic pressure was thus maintained without much discomfort.

(2) In another case the dilator of Schmidtheusen, shown in Fig. 4, was used. This is an ingenious device, whose long conical portion is introduced through the tracheotomy wound and passed up into the larynx from below. The complemental part, shown in the cut, is then passed in so that the two parts rest together, as shown in Fig. 5, with the long cone up in the larynx. The outer plate of the tracheotomy tube is notched, as shown in Fig. 6, in order to receive the shanks of the dilator, thus holding it in place. These dilators are made in three sizes, and I found them very useful in at least one instance.

Fig. 7 is a tracheotomy tube showing the notch as arranged for the Schmidtheusen dilator, from another viewpoint. Fig. 8 shows a hollow silver plug which I placed in the neck opening of one case after the removal of the tracheotomy tube, when in doubt as to whether or not the tube could be permanently removed. This was held in place by means of a tape passed through the chock shown in the photograph and tied around the neck.

Cleanliness around the tube is aided by the application of little squares of gauze, with a slit cut in the center of their upper border, and drawn up under the outer shield of the tube in such a way as to separate the metal from the skin.

In conclusion I may state that the subject of this paper was chosen on account of the relative frequency of specific lesions in

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the larynx, and more especially with the idea of enumerating the complications which arose in a number of cases of laryngeal stenosis which I have met with, hoping that some one of them may aid, or re-enforce, some of the younger men in our specialty in the care of similar cases.

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VASO-MOTOR RHINITIS

(*Apart from Hay Fever*)

E. FLETCHER INGALS, M.D.

[Shortly after the original draft of this paper was completed the author was taken down with typhoid fever, and Dr. Stanton A. Friedberg finished the paper.]

This is an affection characterized by hyperaesthesia of the nasal mucous membrane, with excessive secretion and a soggy, pale intumesence. I do not propose to consider the ordinary forms of hay fever, nor the various forms of hyperaesthetic rhinitis, with symptoms much like those of hay fever, that appear in the Spring, Summer or even in the Winter, similar to the rose cold of June; neither do I intend to consider the persistent hyperaesthesia, which in some patients continues for months, or even years, attended by excessive secretion and occasional intumesence.

In presenting this subject I do not expect to add materially to our knowledge of the affection, although some of my observations may be new, but I hope to elicit a discussion whereby we may obtain helpful information from the experience of others. During the Fall and Winter of 1910 I saw a considerable number of cases, and heard through my professional friends of several others having the peculiar characteristics of this affection. Occasionally at various times in former years I have seen cases presenting the same physical appearance, but I have never had the affection brought so acutely to my notice as during the past season, and, as far as I can recollect, these cases were not attended by the same vaso-motor symptoms.

During the Fall and Winter just passed I treated two typical prolonged cases of this affection, one of which I shall briefly describe. With my associates, Dr. J. Z. Bergeron and Dr. Stanton A. Friedberg, I observed two other well-marked

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cases. I have since talked with two other acquaintances, who appeared to have suffered from the same affection. Dr. D. Braden Kyle speaks of a peculiar pallor seen in prolonged cases of hay fever, as well as of the hyperaesthesia and swelling that attends this disease. He accurately described the attacks and gives all that is known of the etiology and pathology. Dr. Friedberg has kindly looked up the references to the literature of the past few years that could be found bearing upon the condition I wish to describe. He found that the article by C. W. Richardson, "Vaso-Motor Disturbances of the Upper Respiratory Tract," Washington Medical Annals, May, 1910, practically brought the subject down to date. However, much remains to be learned before we can satisfactorily treat the disease.

In its clinical history this affection is very different from the ordinary Winter cold. It has been prevalent in and about Chicago during the last Fall and Winter. The cases that I have observed have occurred both in men and women at ages varying from 35 to over 60 years. In all of them there had been a previous hyperaesthetic condition of the nasal mucous membrane, but none of them had suffered from a frank attack of hay fever, though one had experienced a modified attack, and all had considerable intumesence at some time during the year. None of them had suffered from asthma. As a result, possibly, of the nasal obstruction there had been extension of the catarrhal affection to the larynx, trachea or bronchial tubes in some of these cases, although the extension had generally been intermittent and of short duration. Dr. Richardson classifies his cases as follows, but as these groups would naturally include many nasal affections, it is difficult to determine whether they have any etiological significance:

(a) Paroxysmal form of vaso-motor disturbances attended with congested turbinals, obstructed breathing, paroxysms of sneezing, copious serous discharge from nose. Toxic form. Toxins circulating in blood, acting as direct irritant to vaso-motor system.

(b) A more or less constant type of vaso-motor turgescence of the nasal mucosa. Turbinals relaxed, sodden—paler than nor-

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mal, sneezing. Found in neurasthenic conditions. Breathing more or less impaired by day, complete obstruction at night.

(c) More or less constant type of vaso-motor catarrh, symptoms mostly at night. Connected with disturbance of bronchial mucous membrane. Turbinates flaccid, florid congestion. Paroxysmal obstruction by day, when chiefly affected. In men—due to lack of exercise—asthma may be present.

(d) A type mostly observed in children, especially of a neurotic type, attended by sneezing, nasal obstruction, serous discharge, mouth breathing, and congestion and swelling of the turbinated bodies.

The single case that I wish to report came on in October in a man over 60 years of age, apparently in perfect health, excepting for chronic gouty symptoms that had annoyed him for a number of years. It was ushered in by intense tickling in the nares, which persisted with varying intensity for three or four weeks. This was most marked while the patient was making a railway journey. It was attended by sneezing, secretion and, shortly afterward, obstruction from swelling in one or both nares.

Symptomatology.—Intense tingling, obstruction, discharge. The tingling was at times most intense and would often be excited by unknown conditions. Heat or cold or slight drafts would bring it on apparently by starting the secretions in the nares; a drop of clear serous discharge would at times seem as irritating as a sand burr. For about three months one or the other naris was nearly always closed more or less completely by the swelling which, at times, was so great as to cause a good deal of pain. Often during the day or night both sides were completely obstructed for a long time. During the long course of the affection the discharge continued as a serous secretion like that at the very beginning of an acute rhinitis, or as a thicker opalescent and not very abundant mucus, such as is seldom present for any length of time in acute rhinitis or the usual forms of hyperaesthetic rhinitis or hay fever; not until near the end of the attack did it become heavier and muco purulent, like the discharge at the end of an acute rhinitis.

The obstruction would often become acute without apparent

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cause. It was brought on quickly by eating, and was apparently aggravated even by drinking water. It was always aggravated by the recumbent posture and was not infrequently complete for hours at a time at night, although usually one side was about half free at that time. The obstruction was not confined to the lower side as usual in intumescent rhinitis, but would sometimes affect the uppermost side when the lower was open. Frequently if one side that had been closed for some time were opened by the use of a small quantity of cocaine, the other side that had been open would promptly close, even though it was uppermost with the patient lying down. Vigorous exercise for a minute or two would nearly always open up both sides, but the relief was only temporary. Blowing of the nose greatly aggravated the obstruction, and the closing up thus caused might persist for half an hour or hour.

Exposure to cold air would usually start free secretion in both nares, which would become open for a short time, but both would close in a few minutes on going into a warm room and not much relief would be obtained for several hours. Moderate exposure to the cool air, as in riding in a closed automobile when the temperature was below freezing, would first excite secretion, but in about fifteen or twenty minutes would cause closure of one or of both nares.

During the first six or eight weeks of this attack, notwithstanding the very poor sleep and great discomfort, the general health seemed to remain excellent, but finally the prolonged strain caused a good deal of physical and some mental depression, with occasional slight fever, but no loss of appetite.

The single instance that I have given occurred in a patient affected with chronic gout, who had suffered some annoyance from hyperaesthesia and intumescence of the nasal mucous membrane for years, but who had not had any hay fever. The initial symptoms in this case were due to exposure to the gas, dust and smoke on a railroad train. For several years such exposure had often caused intumescence of the nasal mucous membrane, but it had not previously caused such intense tingling.

This railroad trip was followed by a few days shooting on a

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marsh where there was a lot of wild rice and smart-weed, the weather at the time being bright and warm. Under these conditions, without any exposure to cold or wet, the symptoms were aggravated, and then the trouble was probably increased by the railway journey home. During the next few weeks the weather was fine, with frosty nights and bright, warm days. The symptoms continued the same, and in about four weeks, during the early part of November, another shooting trip was taken both for ducks and quail. For half of a couple of days he was exposed to similar marsh conditions, and the other half of each of these days was tramping through the pastures and corn fields hunting quail. One afternoon in this hunt, while tramping for some time through thick weeds, the nose became completely and painfully obstructed notwithstanding the vigorous exercise. It appeared that the dust from the dried weeds was the principal cause of the aggravation at this time.

In this and in the other cases that I observed there seemed no doubt that the swelling and secretion were due to disturbance of the vaso-motor nerves, although the sneezing resulted from the hyperaesthesia. Often he felt the starting of a drop of serous secretion in the upper part of the naris, which would immediately be followed by intense tingling, as though this drop of bland fluid had been of a most irritating character. This secretion, unlike that of acute rhinitis, did not irritate the nostrils and upper lip. Similar symptoms occurred in the other cases. The general health was not impaired for several weeks, and in three of the cases there was but slight laryngeal tracheal or bronchial disturbance, but in the others there was at times a distinct asthmatic bronchitis.

In all of the cases the mucous membrane was pale and the secretion thin and clear much of the time, but later it became part of the time opalescent and appeared much like thin starch. It did not amount to more than three or four drachms a day.

Diagnosis.—The diagnosis is based on the history, the subjective symptoms already described, the pale intumescent mucous membrane, the serous clear or opalescent secretion, and the exclusion of the more common forms of rhinitis, of sinuitis and of hay fever.

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Prognosis.—So far as my observation goes, all of these cases have been very persistent, and none of them have been materially benefited by the usual forms of treatment.

Treatment.—The treatment in every case proved most disappointing, although a great variety of soothing or more or less stimulating local applications were tried and various internal remedies were employed. Dobell's solution and even normal salt solution used warm as a spray or wash cleaned out the nares temporarily, but caused more complete obstruction afterward. Insufflations containing minute quantities or atrophine and small quantities of morphine and cocaine gave temporary relief, but appeared to make matters worse. Liquid albolene alone seemed to do no good. Liquid albolene, containing 1-3 of a grain of thymol and five minims of oil of cloves to the ounce, or the same with three to five grains of menthol to the ounce, proved irritating and aggravated the trouble, and anything stronger was just so much worse. Quinine and urea hydrochloride gave no relief and aggravated the obstruction. Even inhalations of weak vapor of thymol, menthol or iodine made the symptoms worse. The application that finally gave most relief in the case reported consisted of gr. ¼ of thymol, gr. 3 of menthol, and gr. 3 of cocaine alkaloid in the ounce of liquid albolene, which was sprayed into the nares while the patient was lying down four to six times in twenty-four hours.

In one case I adopted the measures that I commonly use in intumescent rhinitis with most satisfactory results, when the membrane is pale and very flaccid, viz., deep linear cauterizations of the inferior turbinated bodies, followed by various antiseptic and soothing applications. These cauterizations were made across the whole length of the inferior turbinated body, one at the junction of the middle and inferior thirds, and one at the junction of the middle and superior thirds on each side, two or three weeks intervening between the cauterizations. However, in this case I obtained only about 60% of the relief expected, and there was much reaction and discomfort, with swelling and tendency to adhesion after two or three of the operations.

In these cases I recommended removal of the lower half of the inferior turbinated body, the mucous membrane first having been

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lifted from its inner surface, cut at the lower edge, lifted out of the way, and the bone then cut off, the membrane then replaced so as to hang over the cut edge, as suggested to me by Dr. Freer, but none of them would accept the operation, although I had found it very satisfactory in some cases of very persistent intumescent rhinitis. Having gone through all forms of treatment offering any hope of relief excepting the operative, it was decided in this patient to try autogenous vaccines. Accordingly some of the starch-like secretion was sent to the laboratory, where a serum was prepared from an unrecognized bacillus that appeared to be the most numerous of the micro-organisms. On December 12 1 c.c. of this serum, containing 500,000,000 bacteria, was injected. Two hours later the nares were stopped up worse than ever; six hours after the injection there were chilly sensations and aching of the muscles; the pulse went up to 96 and the temperature to 101. The temperature dropped a degree in the next three hours, but ten hours after the injection all the gouty joints in the hand became much more painful than at any time for many months, and considerable pain appeared in one ankle that had not been affected before. Eighteen hours after the injection was given the small joints were still painful and the ankle lame, but the temperature had dropped to 99 and a radical change had occurred in the nasal symptoms; a swollen red and tender area about 4 inches in diameter surrounded the point of injection.

For over two months the subjective symptoms had been those of the first three or four days of an acute cold in the head; now, as the result of the serum, they suddenly changed to those of the closing days of an acute rhinitis, and it was thought the disease had been conquered; but five minutes' walk in the wintry air about twenty-four hours after the injection brought back the former symptoms, and the patient entered the negative phase, from which he suffered for several days as much or more than at any previous time.

For a week after the injection the nasal symptoms were much as in the beginning, the pulse ran about 90-98, and the temperature from 99-100 deg. F. The muscles and the gouty joints were sore and the patient felt weak and depressed, whereas before his general health had been good.

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During the following week the nasal symptoms gradually improved and were much like those of the closing stage of an acute rhinitis, but they then became worse again, and were soon as bad as in the beginning. Whether or not this was due to taking cold could not be determined, but the patient confined himself indoors at home and in his office, and went out only in a closed automobile excepting for about five minutes to and from luncheon. For nearly two weeks even this slight exposure was avoided, but the unsatisfactory luncheons and growing mental and bodily depression caused him to again go to the club for luncheon.

The effect of this serum had been so uncomfortable that it was not repeated for five weeks, when 2-5 of the former dose was employed, but without apparent result. In the interim an acute prostatic congestion had caused much discomfort for about ten days. A week later a new serum was prepared from the secretions in which staphylococci were most numerous. Of this only 1-5 c.c., containing 100,000,000 staphylococci, was injected. Injections of this serum in doses increasing 1-10 c.c. were made twice more at intervals of three or four days, but without any marked result. This carried the case on to the last of January. During this month there was a good deal of warm weather, with the mercury at from 40-50 deg. F., and the warmer the day the less the symptoms. The patient was also able to take about five hours' exercise during each week. Various weak local applications were employed for temporary relief, but we came to believe that nothing did any good excepting warm weather. With colder weather the symptoms were at once aggravated. About the middle of February the patient went South, where he was at once in constant June weather. All the symptoms speedily disappeared, and in a few days his old-time vigor had returned.

On returning to Chicago the latter part of March he struck wintry weather and blizzards again, but the nasal symptoms did not return.

One of the other cases continued under the treatment of two of my friends for some weeks, and then discontinued all treatment without any marked improvement.

In this case a staphylococcus vaccine was prepared from the secretions, but the patient would not consent to have it used.

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In another case an operation on the septum relieved the obstruction on one side, but the obstruction from the pale, soggy swelling of the turbinated bodies of the other side continued for several months.

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VASO-MOTOR DISTURBANCES OF THE UPPER AIR TRACT.

BY CHARLES W. RICHARDSON, M.D.

In presenting this subject for your consideration it is not my intention to refer to those gross pathological changes in the upper air tract which give origin to various reflex disturbances, nor to those peculiar paroxysmal disorders which have a certain period for their onset and a distinctive time limit, but rather to refer to those types of disorders which occur at any period in the year, persist as long as the excitant is active, and present throughout their course no marked organic change within the nasal chambers or accessory cavities.

It is not generally conceded that the term vaso-motor is an acceptable designation for the train of symptoms grouped under this classification, and, while we might be willing to accept such an impeachment, we turn in perplexity to such critics for a better designation. We know that the turbinal bodies of the nasal cavities are extremely vascular organs, subject to marked changes in their vascularity from time to time, which action is stated to be under the control of the vaso-motor nerves. We are also taught that these so-called vaso-motor controlling nerves are a part of the great sympathetic nerve system. Bresgen, who has lately made an interesting attempt to elucidate the relation of the sympathetic and disorders of the nose, states that, through the most careful and painstaking investigation of Bidder and Volkmann, it was shown that the sensory nerves distributed to the nasal mucous membrane contain, as a rule, a very large number of fine sympathetic fibers, frequently from five to ten times as many as the cerebro-spinal fibers. Bresgen also quotes Max Buchs' observation made upon the sympathetic, which, he states, had been apparently neglected. Buchs' observations were made upon the abdominal sympathetic, but, nevertheless, have a bearing upon the sympathetic in its general distribution. According to Buchs' experiments, the sympathetic nerve is non-sensitive only in the

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healthy condition, as shown by animal experimentation. When the nerve is stimulated for some time and rendered hyperaemic it becomes extremely sensitive to pain. Through this hypersensitive nerve various reflexes of a sensory motor or vaso-motor character could be produced. Bresgen's conclusion, from a review of these experiments, is that the various nasal reflexes arise from an inflamed condition of the sympathetic fibres. (Bickett.) These experiments would leave us to believe that the disturbances within the upper air tract of a paroxysmal character are in the form of altered enervation of the sympathetic nerves, however produced and justify us, for the present at least, in designating these affections as vaso-motor. Indeed, our lack of information as to the relation of the sympathetic to the cerebro-spinal system, its capability, or want of capability, of originating impulses, its exact physiological function, and its susceptibility to the influence of altered secretion, haemic changes and toxin, leaves much to be desired in our knowledge of this great system.

It is the general observation of all rhinologists that they are constantly having brought to their attention an increasing number of perennial types of vaso-motor disturbances of the upper air tract, that is, the types of vaso-motor affections which may be manifest at any period of the year, having no certain period of onset and no exact time of cessation. These types manifest themselves whenever the source of irritation is most active, and endure in varying degree of intensity as the source of irritation is present. It will simplify the consideration of these vaso-motor changes by placing them into groups according to the character of symptoms displayed and the changes manifested in the turbinal nasal tissues:

(a) A type of vaso-motor disturbance that appears in paroxysms, being attended with congested turbinals; obstructed breathing, moderate in the daytime, almost or quite complete at night; violent paroxysms of sneezing; copious serous discharge from the nose. This type usually lasts from a few days to a week, and is generally followed by a complete period of relief, until another paroxysm develops. Sufferers from this type usually designate their condition as a "cold."

(b) A more or less constant type of vaso-motor turgescence of the nasal mucosa. This is characterized locally by a relaxed sodden condition of the turbinal tissue, which is very much paler

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than normal. Nasal breathing is very much impaired at all times during the day, complete obstruction being present at night. Violent paroxysms of sneezing occur usually in the morning and frequently throughout the day.

(c) A more or less constant type of vaso-motor catarrh, in which the symptoms are most frequently manifested at night, although paroxysms may occur during the day. In this type there is also in connection with the vaso-motor turgescence of the turbinals a similar disturbance in the bronchial mucous membrane. The turbinal congestion is very florid. The obstacle to nasal breathing is apt to be paroxysmal during the day, and usually occurs at night during the early morning hours. Sneezing is usually manifest when the breathing is markedly obstructed. Coughing and wheezing in the chest, with paroxysms of asthma, may be present.

(d) A fourth group would include those cases of vaso-motor turgescence we occasionally observe in the pregnant woman. This type of disturbance usually manifests itself about the middle of pregnancy, and persists until it is brought to an abrupt termination with the emptying of the uterus. Under this class could be brought all the cases which are the product of sexual excitation or perversion.

It has generally been accepted that all forms of vaso-motor disturbances, whether of the paroxysmal or perennial type, require as the essential predisposing factor the existence of what is known as the neurotic temperament. This nervous temperament manifests itself in individuals prone to these vaso-motor disturbances either in the exalted type of excessive nervous energy, or in the reverse condition of lowered or exhaused nervous energy, which latter is usually designated as neurasthenia.

In the paroxysmal types of vaso-motor disturbances it is also generally accepted that there must be a hypersensitive nasal mucosa in order to respond to the action of the external exciting cause.

In the type of cases which we have under consideration the condition of the nasal mucosa and that of the accessory cavities seems to have no etiological bearing upon the development of the disease. This has been frequently demonstrated in our own work wherein we have removed spurs and corrected deformities without exerting any influence on the progress of the case; in fact, the consideration of this point brings up the whole question as to nature of these invasions, the source of the infection or irritation,

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and the method by which the source of irritation or toxin produces the vaso-motor changes.

With regard to the seat of these affections, there seems to be a general impression, as observed in the published material, that the disturbance is primarily one of the nasal turbinal tissue, excited through external source of irritation or from pathological change within the nasal chambers. From a careful consideration of many cases that have been under our observation we are rather inclined to believe that the nasal mucosa only plays a secondary part in the process, the primary condition being a general rather than a local one, which expends its force on the nervous system, resulting in disturbing the stability of the bulbar center, with relaxation of the vaso-motor control of the mucosa of the upper air tract. Whatever impression may be gained from the objective examination of the upper air tract, which varies greatly as to the deviation from the normal in the cases examined, there will be ever present in the clinical history of all cases the same evidence of undue mental strain, however produced, with ofttimes a corresponding disregard of many of the ordinary hygienic rules of healthful living.

The source of the irritant, whatever its character, must be, in most of these perennial cases, from within, rather than from without, the body. It also seems evident that the irritant agents must be diverse, or an agent or toxin, that can be generated through various violations of the normal physiological processes. Is the irritant a result of the alteration of some of the normal internal secretions, faulty metabolism, imperfect elimination, or production in excess of some normal excretion, the result of biochemic changes in the blood, or from the absorption of toxin generated within the gastro-intestinal tract? It is impossible from our present knowledge to even make a conjecture. Mr. E. B. Waggott, in a paper read before the Laryngological section of the British Medical Association, calls strong attention to our want of knowledge on this all-important phase of this investigation and the desirability of a thorough and scientific laboratory and clinical consideration of this disease in order to elucidate this important point. Indeed, until we have determined the morbid agent which is capable of producing this condition all

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our labor is as naught and our treatment must be more or less empirical.

These diseases, the paroxysmal and the perennial vaso-motor disturbances, come under our special care and we have to accept them, but how little have we done in a scientific spirit to get down below the surface and investigate as to what change takes place in the fluids or tissues of the body that renders an individual susceptible to the source of external irritation in the one type of cases and to the probable generation of irritants in the other type of cases! I am aware of the fact that our president, Drs. Grayson, Stuckey, and a few others, have made some investigations along these lines and are to be commended for their work, but I believe with Mr. Waggott that the true solution of the problem will be through a joint investigation carried on by clinicians and bio-chemists.

The manner in which the irritants or toxin agents produce this action is also a question of speculation with us at the present writing. Primarily, the central nervous system and the sympathetic must be in a state of readiness to be excited and to respond tumultuously. We have learned through Max Buchs' investigation that the sympathetic nerves, when stimulated, become hyperaemic and over-sensitive to impressions. It therefore seems plausible that bio-chemic changes produced in the blood act as a source of irritation to the bulbar center and the sympathetic nerves; when these changes are moderate in character they simply keep the centers and nerves in a hyperaemic condition; when in excess, through increase of the irritants or toxin, above which the stability of the centers, or nerves, can stand, they produce the well-known evidences of this condition.

In a thorough study of the clinical histories of cases and objective examination of those nasal cavities which appear to be normal, as well as those cases in which abnormal conditions have been restored, we have been forced to conclude that the primary impulse that causes the turgescence of the turbinals, with resulting blockage of the nasal passage, comes through the nerve centers, and is not due to local nasal changes. These storms, as they may be called, usually occur at times when the nerve centers are made unusually susceptible through excitement, excessive

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fatigue, or undue mental activity or strain. In all probability, at the same time and through similar influences, the irritant agent, or toxin, is produced in excess. These disturbances occur at intervals and in a manner which, to all observant patients, bears out the logic of these conclusions. The patient will notice that the nasal passage will be very free throughout a day, when, through want of conformity with physiological laws with which they know they should comply, in regard to exercise, diet and work, they will note a gradual filling up of the nasal passage, due not to any local influences whatever, but as the result of the distributed enervation of the unstable centers generated through the violation of hygienic rules and simultaneous in production of the irritants or toxin.

I am aware of the fact that there is a strong conviction in many minds that this condition is solely the product of local changes within the nasal chambers. Adherents of this view even go so far as to maintain that, when demonstrable pathological changes cannot be shown, there nevertheless exist hypersensitive areas in the mucosa, which, if properly searched for, can be localized, and, if cauterized, will correct the lesion. In this same category should be classed those defilers of the nasal chambers who persist in tearing out disabled, though not diseased, middle turbinates. No doubt these various surgical procedures have a counter-irritant influence for a time and arrest for a period the disturbance. Most operators do not see these cases when the vaso-motor paroxysms return, for, after the futility of the surgical effort is demonstrated, the patients seek other advice. From observation of the results of local treatment in my own hands, as well as the noted results from cases which have been in the hands of other workers in this field, I am strongly impressed with the conviction that perennial vaso-motor disturbances of the upper air tract are of constitutional rather than of local origin.

Discussion on the Papers of Dr. Ingals and Dr. Richardson.

Dr. Norval H. Pierce: We must make more divisions than even Dr. Richardson has done. For instance, a recent case that I saw was a lady not troubled until she went to tea parties, and

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I believe tea parties only caused this abundant discharge of clear mucus from the nose, so that she was compelled to use as many as five and six handkerchiefs while attending one of these parties. Another classification refers to those cases in which every conceivable local treatment has been instituted without success, until some one has discovered that the patient has a pyosalpinx or a chronic appendicitis, and after operations for removal of the appendix or pus tubes the patients have entirely recovered from these vaso-motor disturbances without local treatment. I think cases may be roughly grouped into two classes —those due to anaphylaxis and those due to local troubles.

I was recently called out at 2 o'clock in the morning by a very celebrated actor, who appeared at my door in his pajamas and bedroom slippers in great fright, saying his wife was strangling to death. As we approached her bedroom we were informed in a very weak feminine voice not to hurry, she was all right. Even at that time her face was very much swollen, as was the interior of her nose, and there was edema of the glottis. That condition was produced by eating a portion of a raspberry tart; she had indulged in it years before, when the same condition supervened, but she had forgotten about the incident when eating the tart this time. This gives an idea of what a very minute dose may operate on the vaso-motor centres, and probably is an example of anaphylaxis.

As a matter of clinical procedure I should say that Killian's method of cauterizing the anterior heads, inferior turbinated bodies, the promontory of the septum and the anterior heads of the middle turbinated bodies with bichloracetic acid has given me as much satisfaction as any other local treatment, but I would also add what I call "canalization" of the inferior turbinal bodies. An incision is made through the anterior head of each inferior turbinate, and by means of a probe a tunnel is made submucously in various directions up to the posterior end, in this way breaking down the tissue. Considerable hemorrhage occurs, and I have seen beneficial results follow immediately, the cavernous tissue collapsing more or less permanently.

Dr. J. E. Logan: This has always been a very interesting subject to me, as I have had a great many cases of this character. I want to agree with Dr. Casselberry in all he has said regarding local manifestations of what might be constitutional disturbances.

Dr. Delevan, Dr. Mackenzie and others presented this subject many years ago to the profession, advancing ideas very similar

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to what we are discussing in the papers of Dr. Ingals and Dr. Richardson. It is pretty generally agreed that these vaso-motor conditions are from general systemic toxic disturbances. In my experience, the anterior portion of the nasal cavity in the region of the vestibule, the upper portion of the septum and the tip of the middle turbinate are the most fertile soil for these toxic manifestations. I have been able to relieve many of these cases by cauterization either with the galvano cautery or trichloracetic acid applied to these several localities. It is very important, I believe, to get rid of the septal hypertrophy in all of these cases, as it seems to be an especially sensitive spot.

Dr. L. A. Coffin: I wish to second Dr. Coakley's remarks We have made the mistake of doing surgery which probably might have been gotten along without, as indicated by Dr. Richardson. With him I believe the positive factor is very often not from without. The toxinized centre renders the mucous membrane sensitive. I call to mind a most interesting case just convalescing that I was called to about two months ago. A lady quite seventy years of age who was stopped up as to her nasal breathing and had excessive secretion. I thought it probably the beginning of an attack of the grip and prescribed Dover's powders, etc. She seemed a little worse the next day when Dr. Alexander Smith was asked to see her. We gave her nitroglycerine and digitalis. She did not improve, but continued asthmatic. Dr. Smith was asked to see her again, and it was agreed that it was a vaso-motor disturbance. Dr. Smith recommended the subcutaneous injection of adrenalin chloride—15 m. of the 1-1000 sol. I felt as if this mode of treatment would kill her; on the other hand, it was magically beneficial. The stool was foul and the urine showed the presence of indican and albumin. Marked improvement followed the administration of castor oil, the irrigation of the bowel, and the occasional administration of adrenalin chloride.

I have had many cases which seem to arise from intestinal fermentation.

Dr. Richardson speaks of pregnant women, in whom, of course, there are certain toxins which, acting on the nerve centres or on the nerves themselves, render a greater reflex excitability.

Dr. C. F. Theisen: I was surprised that neither of the writers nor any taking part in the discussion have referred to the recent work of Killian, which seems the most exhaustive published. If we are agreed that rhinitis nervosa is produced by a change in internal secretions, we have but two factors, consti-

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tutional and local treatment. We must not lose sight of the proper local treatment. Dr. Killian speaks of two great classes of nasal neuroses, the ethmoidal and the sphenoidal, and lays great stress on the ethmoidal. The anterior ethmoidal nerve is distributed along the septum and the branches from the spheno-palatine are distributed to the posterior end of the inferior and middle turbinates. Professor Killian's treatment is that he first finds his sensitive areas, and in the ethmoidal cases he cuts through the anterior ethmoidal nerve in the anterior part of the septum. In the sphenoidal cases he finds that the posterior end of the inferior tribunate is largely at fault, and he resects that, and he claims a fairly large percentage of cures. We have an irritation of nerve branches in the nose caused by toxins, and this seems a rational mode of treatment, because in removing the posterior end of the inferior turbinate these nerve branches are cut through.

Dr. A. B. Thrasher: I desire to mention two expedients for the relief of the most troublesome symptom in this disease. I have reference to the difficulty in breathing. One is a rather free incision going into the sinuses of the lower turbinals, giving free exit for the fluids. This has given almost immediate relief in these cases.

Constitutionally the thing most valuable has been the hypodermic use of adrenalin in doses of from 5 to 10 minims of 1-1000, once or twice a day.

These are the only things I have found of value.

Dr. C. W. Richardson (in closing): This whole subject is still on uncertain ground, and the plea I make is that we go into this subject and elucidate it in a thorough manner. Find out what is the change which takes place in the secretions or in the blood, the toxins which are generated to produce this disturbance, and if found to be of a constitutional nature, then find out the method of preventing them.

I would like to state that in all my cases I have tried the various local treatments, such as washing out the antra, correcting existing deformities, with results good for a time, but invariably there is a subsequent return to the former condition.

Dr. J. Payson Clark: I have no doubt that there are cases which arise from auto-intoxication, but it is difficult in my mind to see how you can make this diagnosis at once. There are cases undoubtedly in which a local irritation exists, and until we have ruled out the presence of a local irritant I do not think it quite fair to say that these cases are all due to auto-intoxications. I have in mind a number of cases I have seen which have been very much relieved by washing out the antrum with

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simply normal salt solution—they have been cured, I should say. Now, one cannot tell at first sight whether there is some unhealthy condition in the antrum or whether it is an auto-intoxication. I recall several cases where the simple washing out of the antrum gave almost immediate relief, but also the washing showed nothing which we could diagnosticate as a pathological condition. I have had patients where both sides of the nose were completely obstructed, who had sneezing, and swollen, pale turbinates, and transillumination has shown both antra equally light, and yet on washing out one side the patients have come in saying they were free from symptoms on the side on which the antrum had been washed out, but the other was still obstructed. I have also reported cases where on washing out the antrum, though both sides were translucent, I obtained a very thick mucus, and in these cases there was relief. One of the cases was that of a pregnant woman.

This is a simple procedure, and if you can get relief in these cases it would take them out of the class of general auto-intoxication.

Dr. W. E. Casselberry: That which we are discussing is a symptom of more than one disease rather than the disease itself. I do not doubt that the predisposing condition of this intumescent hyperaesthesia, or one form of vasomotor rhinitis, is constitutional, but I cannot doubt that the exciting cause is a local action in the ethmoid region and on the turbinals. An analogous condition, hay fever, bears this out. Hay fever itself is, fundamentally, a constitutional condition, but protect the local region from the pollen or toxins and there is no hay fever. This has its bearing on the treatment. Correct the constitutional condition if you can, but usually you cannot. Your patient is induced, perhaps, to lead an hygienic life and he suffers just the same, but many times you can by local treatment secure prompt and definite mitigation which enables him to withstand the disease. A pronounced beneficial effect is produced by a single deep linear cauterization of each turbinal, both inferior and middle. In pregnancy it acts very promptly and its good effect endures for the rest of the period, at least. She no longer feels the obstruction. It is not always equally effective in the class described by the essayist, probably for the reason that here the ethmoidal labyrinth rather than the turbinals is the primary local site. We have heard condemned the operation of partial resection of the middle turbinals, but I have never known it to be harmful, and have seen it beneficial. It may not cure the disease, but as in hay fever, it will enable the patient to withstand the disease so that he feels it less, by permitting bet-

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ter drainage from the ethmoid cells and more breathing space. It is a very welcome mitigating minor operation, in my experience. I agree with respect to the antrum, but more than all I ascribe the symptoms so far as pertains to local causes to the ethmoid cells.

Dr. B. R. Shurly: There have been several cases under my observation during the past winter and there are certain observations which I think are common to this entire class of cases. First of all, they are almost exclusively associated with people of high tension and peculiar nervous temperament. They are almost all among the intellectual class of patients. One case which I have in mind particularly was a woman teacher of mathematics, who was under great mental tension during the entire winter. She had been subjected to many of the various procedures of nasal surgery without any relief whatever, and local treatment in this and all the other cases that came under my observation, excepting the use of cocaine, was almost universally followed by more or less aggravation of the local vaso-motor symptoms.

Another observation which seems common to this class of cases is the fact that this particular vaso-motor disturbance is apparently almost always associated with some vasomotor disturbance elsewhere. Most of my patients suffered from urticaria or some other vaso-motor trouble in some remote part of the body.

We may have the problem of interference with the excretions from the kidneys and disturbance of the regulators of the vasomotor nervous system. It seems back of it all is the problem of the internal secretions, which we are just beginning to understand in a very small measure, and in this particular class of cases a great deal of investigation has recently been done, showing an excess of adrenalin secretion shot into the blood stream will produce constant irritation of the vaso-motor conditions with the emotions of anger and general congestion of nasal mucous membrane.

In the line of therapy the best results came through the use of valerian and the general sedatives of that type, together with the hypodermic use of citrate of iron, which has a very quick and sharp effect on the general nervous system and blood stream in the way of adding additional tone to the entire vaso-motor system.

Dr. Algernon Coolidge: In discussing the etiology of vasomotor rhinitis it seems to me impossible to rule that hay fever is foreign to the subject, not only on account of the similarity of the symptoms, but especially because of the intermediate forms. From hay fever we learn that certain symptoms are produced when two factors combine, a definite irritant and a peculiar intolerance. But there are at least two forms of hay fever, the

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vernal and the autumnal, each with its special irritant form of pollen. There also exists a similar disturbance not seasonal, because the irritant is not seasonal, in which the victim reacts to emanations from horses and certain other animals. All three of these disturbances are distinct from each other. A victim of one does not necessarily suffer from the others. The striking fact is that intolerance to one irritant and immunity to another occur together. In additon to these three more typical forms, similar symptoms are in some persons excited by other irritants, and also under circumstances in which the presence of an irritant can not be proved. But when a fairly definite symptom-complex is known to be caused by intolerance to one of a group of different substances the presumption is that a similar set of symptoms is due to an intolerance to some unsuspected extraneous irritant.

Dr. R. C. Myles: I have been experimenting for a great many years with vaso-motor rhinitis, and I just want to say that outside of all the general treatment, local and constitutional, there is something I would very much urge you to try, and that is cutting a section out of the tubercle of the septum, making a complete section down to the junction of the perpendicular plate of the ethmoid where the triangular cartilage meets it. There are a lot of glands there. I make a section down on the septum about ½ to ¾ of an inch, under cocaine and adrenalin. It is practically painless, although there is sometimes violent hemorrhage. In a great many cases after using all the other methods I have had the most remarkable and brilliant results by this procedure, and the theory is that by this means you cut the transmitter of the irritation either to Meckel's ganglion or to the brain centre.

Dr. Cornelius G. Coakley: Late last Fall, in New York, more of these cases were under my care than I have seen in any other one year. I agree with the writers of the two papers that local treatment in these cases is of little or no avail. Irrigation and sprays often produce an increasing amount of irritation, with subsequent obstruction in the nares. These cases seem to me to be caused by some auto-intoxication plus the bringing about in the nasal mucous membrane of a peculiarly irritable condition. Some of these cases if removed to better local surroundings will be improved.

The auto-intoxication is most difficult to define. I have had biological and physiological chemists working on the internal secretions, on the urine, and on the excretion itself collected in three or four cases, and it has been found that this watery secretion from the nares is principally water with a little sodium chloride and the merest trace of albumin, and there has been found nothing bacteriological or chemical in the secretion that

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would help us in determining the cause of the trouble. In some of the cases I have found that the excessive ingestion of carbohydrates when cut down causes improvement at once. In other cases a decrease in the protein intake had the same result. I have gone all through the uric acid treatment and have been disappointed in the results in many cases. In other cases we have found a large excess of indican in the urine, and in these cases when the indican has been removed very few have improved.

I believe with the better understanding of the internal secretions will come the approach to the solution of this problem, for, as I said in the beginning, I believe the condition to be due to some auto-intoxication.

Dr. R. C. Myles: I have been testing the various methods of treatment of vasomotor rhinitis. In addition to the general treatment I would urge you to try an operation which consists of cutting a section out of the tubercle of the septum. I make the excision with a Grafi knife from the septum, removing a piece about ¼x½ of an inch, under cocaine and adrenalin. It is practically painless, although there is sometimes violent hemorrhage. In a great many cases, after using all the other methods, I have had the most remarkable and brilliant results by this procedure, and the theory is that by this means one cuts the nerve which transmits the irritation either to Meckel's ganglion or to the brain centre.

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A REVIEW OF EIGHTY-ONE CASES OF INFLAMMATION OF THE FRONTAL SINUS.

A Comparative Study.

BY GEORGE L. RICHARDS, M.D.

For the purpose of analyzing the relative number of cases of acute and chronic inflammation of the frontal sinus which I have seen during the last few years, I have gone over my records and made some comparisons that may be of interest. Acute inflammation of the frontal sinus is either markedly on the increase or else relief is oftener sought of the specialist than in former years. It is my belief that since the prevalence every year of grippal colds the absolute number of cases of frontal sinus inflammation has increased.

These comparisons are made on a study of eighty-one cases, ranging in age from 13 to 70 years. Cases now under treatment are not included, so that the end results are known. None but cases of undoubted frontal sinus trouble are included, the diagnosis having been confirmed by transillumination, probing or syringing, by the presence of pus or by symptoms which rendered it unmistakable. Radiographs were not taken, as I have not been so situated as to make this practicable. I have invariably used transillumination in all suspected cases, and, while not infallible, it does furnish valuable diagnostic information, and I rely considerably on the findings. In most of the cases transillumination was positive. It seems to be of little or no value except for diagnostic purposes, giving no information as to the progress of the disease, since even when pus has been evacuated the sinus will still look dark until the mucous membrane has again resumed its normal thickness.

The patients came with the following symptoms: Sixty-eight, or 84 per cent., complained of pain in some form or other, either as headache, severe sharp pain referred to the region of the frontal sinus, or the combination of pain with discharge. One

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had exophthalmcus in addition to the pain. Ten complained of discharge only, the secretions not being sufficiently pent up to cause severe pain. One came with symptoms of general anemia and pus absorption, having been referred on account of long-continued pus discharge. One complained of swelling on the face, nature having forced an opening through the cheek—the only case of the kind I have ever seen. In the very acute cases local tenderness was often present, but this was by no means invariable. The point of reference of the pain, while in the main of diagnostic value, is not always certain, as one case which proved to have no involvement of the frontal sinus, but of the antrum, complained only of pain in the region of the frontal sinus. The pain ceased at once after a radical operation on the antrum, showing it to have been due wholly to pressure of the retained antral secretions.

Etiology.—In forty-one cases the etiology was embraced under the term "grippal cold," this term being used as a probably accurate cause in by far the larger number of the acute attacks. In the case of the chronic inflammations, and some of the acute ones, the etiology as given was so indefinite that I have classified it as unknown, and of these there were thirty-five. Of other causes, one was trauma, one infection of the antrum, one ethmoiditis, one a swelling of the fronto-nasal duct. While swelling of the fronto-nasal duct is given on the records as the direct cause only once, it was doubtless responsible for the trouble in a good many other cases. The same is very likely true of ethmoiditis and of antrum suppuration, since many of the cases had suppuration both in the antrum and the frontal sinus, and in chronic inflammation it is often impossible to determine which is primary. In one case the trouble came on so directly after an automobile ride as to make it appear at least that the fast riding and possible dust inhalation was responsible.

To my mind, the automobile is and will continue to be a great factor in the production of inflammatory troubles of the upper air tract. It grinds up the road bed into dust and then throws it into the air to be breathed by all passers. From the standpoint of public health I regard the automobile as detrimental to the best interests of society.

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Location—Both sinuses were involved 19 times, or 23.5 per cent; the left sinus alone 26 times, or 32 per cent; the right sinus alone 36 times, or 44.5 per cent. In the acute cases the involvement of the right or the left sinus rather than the reverse was apparently due in the individual case to the anatomic conformation of the nose and the relation of the fronto-nasal outlet to the septum and to the turbinate, the most obstructed side being the one usually involved. Where both sinuses were involved, there was frequently communication between the two, though not always.

Acute or Chronic—48 or 60 per cent of the cases were acute; 6, or 7 per cent, were subacute; 27, or 33 per cent, were chronic.

Pus Demonstrated—Pus was demonstrated in 74, or 91.3 per cent.

Gas Cases—Pressure; five cases I have designated as gas cases. In these I considered the symptoms to be due to closure of the outlet of the fronto-nasal canal, with consequent sense of pressure caused by the expansion of the air or gas within the sinus, with resultant pain. It is also possible that negative pressure or the absorption of contained air may cause the pain. One can only theorize as to this. One of the series was operated on externally for this reason only, the middle turbinate having been previously removed without making it possible to probe the fronto-nasal duct and without relieving the pain. The patient was told in advance that probably no pus would be found. The fronto-nasal duct was found closed for a considerable distance and had to be reopened by curetting. There had been frequent severe headaches, which entirely disappeared after the operation, which was done after the Ogston-Luc method, with immediate closure of the external opening. In the second case of this kind pus was suspected, but was not found. In two other cases there was no pus, but the acute pain was relieved by syringing through the fronto-nasal duct, and the general symptomatology seemed to warrant the diagnosis of acute frontal sinusitis. The pain may have been due in these two cases, as in the other five, to the presence of gas.

Complications—In 14 cases the antrum also was involved, and in these appropriate treatment was given at the same time.

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Three had otitis media on one side, due apparently to direct infection by the pus through the Eustachian tube. In one instance otitis media occurred on both sides, accompanied by a profuse amount of discharge. As the otitis media occurred after the initial diagnosis of frontal sinus trouble was made, it admits of no doubt in my mind that it was secondary to the frontal sinus trouble. In one of these cases of otitis media, bacteriological examination showed the presence of micrococcus catarrhalis. In one case a grippal cold brought on an acute mastoid and probably coincidentally a frontal sinus trouble, but the frontal sinus was not noticed until during the convalescence from the mastoid operation. There was atrophic rhinitis in three cases. There was an external opening in one. There was a nasal spur in two. There were septum deviations in three, so marked as to really complicate. In many of the others there were minor septum deviations. One case had involvement of both antra, the right sphenoid and the ethmoid cells. Another had involvement of both sphenoids, both antra and the ethmoids.

Treatment—Sixty-five cases were treated intranasally, and in 16 radical operations were done. Proportionately, 80 per cent were found to be curable intranasally, and 20 per cent required some type of external operation. In all of the intranasal cases syringing through a canula with varying solutions, for the most part a simple sterile saline solution of the Seiler tablet type, was used, and formed the basis of the intranasal treatment. In a few cases, persistently obstinate, other solutions were used, such as weak corrosive sublimate, solution of copper sulphate, argyrol and others. Simple syringing with any sterile, non-irritating solution is usually all that is necessary, the solution clearing out the sinus to a greater or less degree and leaving the outlet so that it drains satisfactorily during the hours that follow the syringing. Twenty cases were syringed, or washed, through the canula, without removal of the turbinate. In one treated the same way there seemed to be no result until a copper sulphate solution was used for a few months, after which a complete cure took place. This patient absolutely refused to allow the removal of the middle turbinate, even though the

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introduction of the canula was painful and difficult. In thirty-two cases the middle turbinate was removed at the very beginning of the treatment. In three, simple shrinking was sufficient. In four, shrinking and partial fracture of the turbinate; that is, displacing it toward the septum, allowed entrance to the duct. In one, the turbinate was removed and the ethmoid curetted before entrance could be obtained. In four, the outlet only was curetted. In this respect one case is interesting, as it had been previously operated upon satisfactorily, intranasally, by a prominent laryngologist of Brooklyn, and came into my hands during the Summer vacation of the patient. I found the outlet of the fronto-nasal duct covered over by a thin bit of organized tissue. When this was removed the fronto-nasal duct was again made patent and all the symptoms of pain and discomfort immediately disappeared.

Sixteen cases were operated upon radically; that is, by some type of external operation, with reopening or enlarging of the fronto-nasal duct, clearing out of the neighboring ethmoid cells so far as possible, and after-treatment either by closure of the external wound immediately, or at the end of ten days to a fortnight—the so-called Ogston-Luc operation, with variations; operation in the same way, but maintaining the external opening, allowing it to fill in with granulations; and the Killian operation. There were six of the Ogston-Luc type. In one case two operations were done three years apart, with apparent cure in the interval, but an ultimate breaking out because the first operation was not sufficiently thorough. In two cases the external opening was made large and was absolutely maintained until filling up with granulation took place. There were two cases, in which the middle turbinate was first removed, and an attempt made to cure by intranasal treatment. This failed, and an external operation was afterward done. There were two cases in which the Ogston-Luc operation was first done, and, failing to heal, the Killian operation was afterward performed. There was one Killian operation, with apparent cure for several months, but afterward breaking out with pain and slight pus discharge at the lower border of the external wound. On examination one diseased ethmoid cell was discovered; this being

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thoroughly removed, prompt and permanent healing took place.

Results—Sixty-six cases can be considered as cured, although in one of them in which there was general ethmoiditis, with involvement of the sphenoid and antrum as well as both frontals, the final cure did not occur until after five years.

Two of the acute cases had recurrent attacks, one being finally cured and the other still having an occasional recurrence of acute attack.

There was improvement in all. Under these I include those which had improvement at the time they disappeared from observation. They were presumptively cured, but the record is not definite as to this.

Two were lost sight of after the first examination and treatment. Whether sufficiently relieved or whether treated by another physician, I do not know. 83.75 per cent can fairly be said to have been cured.

For the permanent comfort of patients with frontal sinus trouble it is essential that the fronto-nasal duct remain open, unless the sinus be entirely obliterated.

One case operated upon externally for severe headaches, in which the simple Ogston-Luc operation was done, with immediate closure of the external opening, the drainage tube being maintained in the nose for about ten days, at first had immediate relief, then came back some weeks after, complaining of occasional severe headaches. Examination showed that the opening down into the nose had been made either insufficiently large or had not been maintained long enough, it being impossible to pass a probe into the sinus. The pain was apparently due to gas formation. Later, a probe was carried by this point and the headaches disappeared. Were I to do this same case again I should maintain the drainage tube for a very much longer period.

One chronic case has long intervals of no trouble, the middle turbinate having been removed on each side, but after a period of some months and a few severe colds, will come back with polypi blocking up one or the other of the fronto-nasal outlets. This case cannot be called a cure, yet as both sinuses are involved and communicate, an external operation seems to me unwarranted,

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and it would not be accepted by the patient even were I to suggest it.

Another case, previously referred to as suffering from general anemia and pus absorption, has obtained a cure of the sphenoid and both antra, but still has a little pus discharge from the two frontal sinuses, which are large and communicate. This patient is a woman, fair-featured, able to perform her usual avocation, and an external operation seems to me unwarranted, as there are no symptoms except a little purulent discharge, and this at times almost disappears.

Conclusions—The sinuses communicate far oftener than I formerly supposed was the case, this condition existing in a good proportion of the chronic cases, and I think occasionally in an acute one, especially if it be bi-lateral.

Several of the cases cured by intranasal treatment have been chronic, and I by no means despair of obtaining a cure in a chronic case by intranasal methods, provided reasonably good drainage can be obtained. As gravity favors natural drainage, this should always be tried a suitable length of time in the absence of severe symptoms. Several of my cases have absolutely proved this.

The time required for a cure has been very various, from a few days in the sharply acute case to a period of weeks or months in chronic cases. Most of the acute cases in which the middle turbinate could be removed recovered after two or three weeks of treatment.

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ATTENUATED TYPES OF SUPPURATIVE SPHENOIDITIS IN RELATION TO SO-CALLED POST-NASAL CATARRH, TO HEADACHE WITH MENTAL DAZE AND TO ASTHMA.

BY W. E. CASSELBERRY, M. D.

Interest in the accessory sinuses is culminating in a new nasal pathology. There are twenty or more of these outlying and attic chambers of the nose which together have an area, as well as a proclivity for infection by germs, far in excess of all the rest of the nasal structure. Nasal polypus has been merged with sinus infection, hypertrophy of the middle turbinal with hyperplastic ethmoiditis and atrophic nasal disease, as I once suggested, with suppurative ethmoiditis. In the same trend will be found my present theme, to the effect that the condition, classed as naso-pharyngitis but commonly referred to as post-nasal catarrh is due, to an extent not yet realized, to infection of the sphenoid sinus, together usually with implication of the post-ethmoid cells. The exact source of this "catarrhal" flow or "dropping into the throat" has been wont to elude, with embarrassing frequency, the most skilled in the art of "mirror gazing." At times empyema of the antrum, secreting clefts of adenoid overgrowth or turbinated posterior hypertrophy could be held responsible and the "dropping" then be remedied, but more often, despite all efforts, the flow would persist, showing that the fountain head had not been reached. The sphenoid sinus, though sometimes suspected, and by Schaeffer (1), Hajek (2), and others (3-4), vaguely accused, being out of sight, has been out of mind, until adrenalin's vaso-constrictor effect availed to facilitate reaching to its depth by exploration and operation. By this and similar means my suspicion has so often been converted into fact that I seek to attach to sphenoid infection its full import as a source of post-nasal discharge. In point of frequency, however, it is not that grade of infection already known as empyema or sup-

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puration of the sphenoid sinus, whose product is typical pus, but it is the less pronounced, hitherto not definitely recognized, degrees of suppurative sphenoiditis, herein designated for the sake of emphasis, as "attenuated types," and whose secretions appear as variously modified puruloid products, which result in the kinds of post nasal discharge specified. Bacteriologically, there are many varieties (5), but most of the puruloid products which constitute post-nasal discharge may be grouped, for the purpose of clinical recognition as issuing from the sphenoid sinus, into two classes.

The first class includes secretions, varying from pus to muco-pus, of the sort familiar in focal suppuration like that of sinus empyema of a minor degree. If the nasal space permit, it may be observed to issue as a bead from the sinus, being mobile at its source and colored from pale yellow to a bright orange or saffron hue. It may thicken, but not into a varnish-like film, and it does not readily induce nasal or pharyngeal atrophy, tending rather toward associated hyperplasia of the oedematous type and polypi in the spheno-ethmoid sulcus.

The second class of secretion is quite unlike the product of ordinary focal suppuration. It is a viscid, mucilaginous, sometimes foeted substance which, when copious, forms into long, ropy strings and blocks the nasal passage, defying ordinary means of expulsion. When scanty, it accumulates over the Eustachian tube or elsewhere in the naso pharynx in brownish splotches, comparable only to liquid glue, which, when "set," form hard, adherent crusts, liable to require the leverage of a probe to pry them loose; but when not quite so scanty it spreads on downward like a coat of varnish over the posterior wall of the pharynx, where its characteristic tendency to induce atrophy with dryness by throttling blood vessels and glands, is exposed to view. Atrophic or dry pharyngitis, therefore, though hitherto regarded as an independent, rather intractable disease, should take its proper place as also an indicator pointing upward to the primary focus of infection—the sphenoid sinus. Moreover, the recognition and elimination of suppurative sphenoiditis as the chief source of the film which incrusts the pharyngeal wall, opens up for the first time, a definite and hopeful

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line of treatment for atrophic pharyngitis, inasmuch as, thereafter, the atrophied mucosa shows considerable power of regeneration.

It is of diagnostic significance looking toward the exclusion of ethmoid implication, to determine by the mirror whether or not either one of the two pathways favored by an unmixed sphenoid discharge, be followed. The route taken by

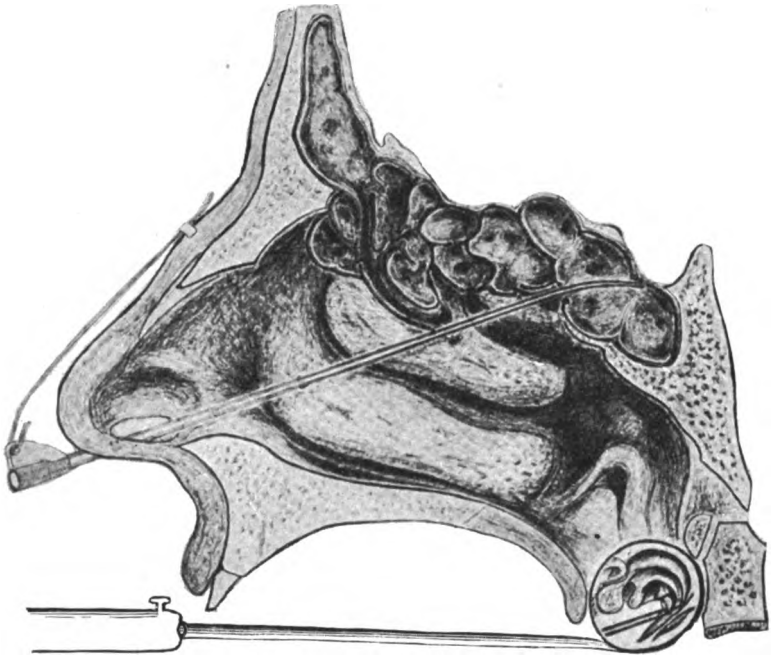

Fig. 1.

Casselberry's sphenoid cannular probe, its distal end inserted in the sinus in readiness for the irrigation test, its proximal end anchored to prevent slipping out and the rhinoscopic image as viewed to prove its position in the osteum sphenoidale.

a scanty secretion is apt to be marked by a streak of viscid discharge leading from the sphenoid outlet laterally downward into Rosenmuller's fossa, where it collects till it overlaps the Eustachian orifice. The other route is taken by a discharge copious enough to bridge the space to the rear edge of the

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septum, down which it courses to collect in the back part of the inferior meatus of the nose.

The osteum sphenoidale itself is located out of sight, nor is the outlet visible by reflection from the rear unless marked by a bead of pus or protruding polypus. However, in the rhinoscopic image, just outside the osteum, can be seen a portion, one centi-

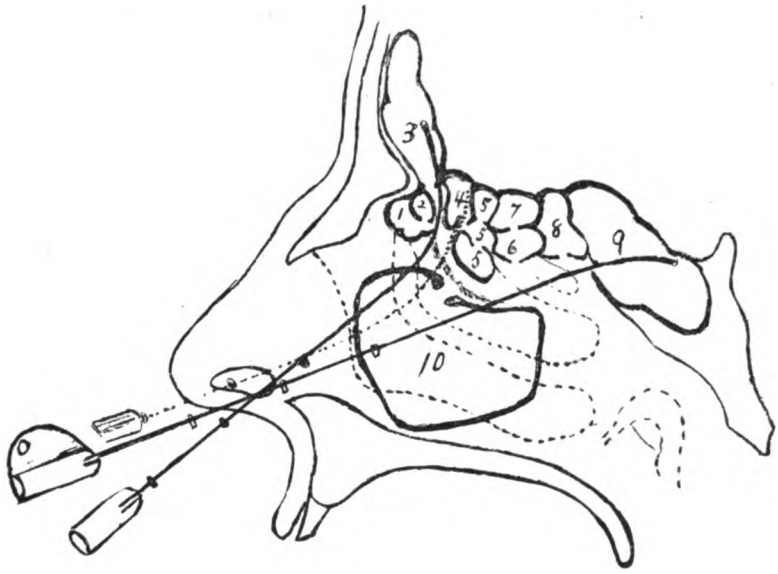

Fig 2.

THE NASAL ACCESSORY SINUSES. A Key to Fig. 1.*

1 2 3, if none forsakes,
Frontal cells, as Killian states.
3 mayhap the sinus makes,
4 the frontal probe mistakes,
5 the bulla, sections three,
All belong to A. E. C.

6 the lower P. E. C.,
7 ascending P. E. C.,
8 the cell of highest meatus,
9 the sphenoid (hawking screatus),
10 the antrum, first and greatest.

*NOTE—Any or all of the frontal cells (higher infundibular cells) may be absent and exceptionally one or more additional, but "lower" infundibular cells may be present. The frontal sinus quite commonly is formed from and represents the 3rd frontal cell, and sometimes the 2nd cell, although typically it is formed from the frontal recess. The 4th frontal is the anterior ethmoid cell which the frontal sinus probe is liable to enter, a too horizontal slant of the probe handle indicating the error (Fig. 2), unless cell 4 be expanded forward to form a frontal bulla. A. E C.—Anterior Ethmoid Cells. P. E. C.—Post-Ethmoid Cells. The "cell of highest meatus" opens above the superior turbinal, but it may be rudimentary, when its position next the spenoid is taken by one of the other posterior cells which open into the superior meatus or by an additional cell of the posterior group

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metre in length, of a probe inserted in the sphenoid sinus, while a lip of the osteum is apt to be raised by the probe into the mirror's scope. As this is the best method of proving the introduction of the cannular-probe, to give assurance of reliability to the diagnostic tests which follow it, I have sought to perfect the technique of the method and make it more generally feasible. Thus, to prevent slipping out of the cannular-probe during the forward adjustment of the patient's head, required for rhinoscopic examination, the probe is anchored to the dorsum of the nose by a flexible wire and a piece of rubber plaster, Fig. 1; and to avoid the annoyance of having to withdraw the probe to reintroduce a cannula for the irrigation test, a combination cannula and probe of original design is used, which, for service as a probe, is well balanced, bulbous-pointed and plainly graduated at 7-9-11 C. M., and for service as a cannula has a flattened socket with a vertical plate-like finger-piece to aid in guiding the distal curvature in the proper vertical line. A perforation in the plate provides for the anchoring wire. Fig. 1. Having inserted the cannular probe 6½ or 7 centimetres to the anterior sphenoid wall, near to the nasal roof, above the osteum, one feels around with its bulbous end, in short steps zigzag downward, but inclining more toward the septum, when suddenly it is felt to slip into the cavity as if engulfed, reaching a total distance of 8 to 11 C. M. or more, measured not from the nasal spine, which is difficult to identify, but from the columma just in front of the naris, where it is naturally crossed by the probe.

Confirmation of the presence of the cannular-probe in the sphenoid can be felt and heard as well as seen. Tapping the sinus wall within, from point to point, not only serves to indicate a proper sphenoid contour, depth and direction, but it often elicits another characteristic which I will term the sphenoid click—a touch as if the bone were almost but not quite bare, accompanied by a leaden metallic clicking sound, a combination peculiar to the sphenoid and not produced in like degree in any other sinus. It is not caused by diseased bone, but by the fact that certain areas of bone within the sphenoid naturally have but little covering and are somewhat resonant. Areas of diseased or dead bone possibly

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may be encountered, but in the presence of the "sphenoid click" the sense conveyed must be unmistakably rough and grating in order to be interpreted as due to dead bone.

The irrigation test is of the first importance in precise diagnosis, but I have found it necessary carefully to adapt the apparatus to the purpose by assembling in portable cases multiple positive and negative pressure bottles having uniform hose and couplers which fit all the cannulas and compressed air cut-offs. It is adjusted to be operated by knee or foot pressure, and the mechanism with solution is so standardized that the office assistant, by routine, can quickly fill, connect and disconnect it, which permits the operator, unassisted, to test one or more sinuses without unreasonable expenditure of time or change of position.

Records are kept of all sinus cases by sketches and notations on life-sized stock diagrams, the actual cannular-probe used, with distance and curvature being outlined on the chart in connection with the particular sinuses tested. Fig. 2. From fifty to sixty entries of this sort have been recorded under the diagnosis, in part, of suppurative sphenoiditis, the diagnosis being qualified as "in part" for the reason that in less than half the number was the infection limited to or even predominant in the spheno-ethmoid group, other sinuses in the remaining half having been jointly affected, and in less than one-eighth of the number was the infection limited to the sphenoid alone without involvement of the post-ethmoid cells. A study of this series leads to the conclusion that aside from antrum disease, which may discharge backward but below, not above the middle turbinal, and with the exclusion of adenoid growth or clefts, Thornwald's bursa and pronounced turbinated posterior hypertrophies, practically all other chronic post-nasal puruloid discharges are due to suppurative sphenoiditis.

Headache.—The headache of suppurative sphenoiditis baffles the descriptive power of patients, who often cannot tell exactly where it is or what it is like. About one-third of my sphenoid series suffered occipito-parietal pain, the best description being given by a university professor, who said: "It is a boring pain toward the middle of the head, far back between the eyes." More

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often it is located in the back of the head, but connected also with pain far back in the eyes, and next in order is the top of the head and side near the top, or radiating from the ear and mastoid to the top of the head; so I have come to regard occipito-parietal headache as indicating exploration of the spheno-ethmoid group of sinuses, in fact, as indicating exploration of all the sinuses, for exceptionally I have known pain which originated in the frontal sinus to be reflected to the back of the head, and once, by an undue irrigation pressure in the sphenoid I caused a severe pain which was referred by the patient to the front of the head. The headache is prone to manifest a daily periodicity by augmenting during the forenoon, lasting until late afternoon, and ameliorating or ceasing toward evening with or without an appreciable escape of muco-pus from the naso-pharynx.

One patient sought relief after enduring for months an increasing occipital and parietal headache with eye pain, when at the third daily effort a cannular-probe penetrated the sphenoid sinus and liberated a fetid discharge with prompt relief. Another, a young merchant, addicted to an incessant hawking screatus, complained, in addition to the headache, of being in a dazed mental state which impaired his business capacity, he saying that he could not think properly on account of what he called his "catarrh." A double Hajek operation for the free drainage of both sphenoid sinuses was so definitely successful in remedying his disability that I agree with Sleuder (6) in respect to the disabling character of the headaches, and with Schaeffer (7) in the emphasis laid upon mental deterioration, despondency and incapacity for business, as serious and not infrequent symptoms of suppurative sphenoiditis. Other similar conditions observed, each in different patients of my series, were mental hebetude, lapse of memory and neurasthenic excitability.

Merely touching with cotton the site of the spheno-palatine ganglion caused patients to remark that the right spot was reached as it excited the same kind of pain or suggestion of neuralgia as that for which relief was sought. Occasionally when with a probe or spheno-ethmoid cutter I reached the vicinity of the spheno-palatine ganglion along the post-ethmoid wall and adjoining face of the sphenoid sinus, the patient has exclaimed at suddenly feel-

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ing a sharp pain at one or more of these five points: the back of the head, the top of the head, the eye, the ear and upper jaw. These are also the starting points of the pain when it assumes a somewhat neuralgic form. The ganglion distributes sensory branches to the spheno-ethmoid region, the anastomoses of which, through the ganglion's connection with the superior maxillary division of the fifth nerve and thence to its dental and auriculo-temporal branches, and also through the Gasserian ganglion to the ophthalmic division of the fifth nerve, account for the transfer of the painful impulses to at least four of the five points mentioned. The evidence, therefore, is reasonably conclusive that spheno-ethmoid disease is capable, by exciting the spheno-palatine ganglion, of causing headache of the type described, but it should not be inferred that all sphenoid headaches originate through direct action on the ganglion, for the prompt relief afforded by the liberation of retained discharges and the analogy of pain by distention in other sinuses, indicate that distention of the sphenoid sinus by fluid or decomposition gas is capable alone of causing the same character of headache.

Asthma.—The relationship of nasal accessory sinus disease to bronchial asthma, though manifested in varying degree, is now accepted as an actual clinical fact. Not that they figure directly as cause and effect, but rather, both of them, as resultants of the same systemic dyscrasia, even the nasal complication showing signs of a deeper origin and significance than that merely of a local reaction to infection. In spheno-ethmoid asthmatic subjects I have repeatedly observed a rapid formation of an oedematous or polypoid exudate so profuse as to seem entirely disproportionate to the local cause, traumatic or other nasal irritation, unless it were promoted by systemic conditions. The day after an operation for multiple polypi, for instance, one would find the nostrils again packed with what looked amazingly like a fresh growth of polyps, sprung up over night. Being semi-translucent and lobulated, this exudate is not like that of cauterization or diphtheria. It separates usually within a few days, the patient perhaps reporting that he has blown out what he thought were more polyps; but it is liable to persist for weeks and to appear so much like sessile polypi as to raise the question of its

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possible transformation into polypi. Potassium iodide tends to limit its formation. The tendency to exudative processes in the intestines as well as in the nose, which characterizes asthma (8), also indicates a constitutional proclivity which may be termed an exudative diathesis and regarded as identical, at least in part, with the asthmatic dyscrasia. Nevertheless, putting the nose in a healthful condition eliminates a potent aggravating influence, and is followed, at the least, by amelioration of the asthma and, at the most, by such a reduction in the number and severity of the paroxysms that no more than a residual asthmatic tendency remains.

About one-third of the cases of suppurative sphenoiditis were asthmatic subjects; in several polypoid hyperplasia in the spheno-ethmoid region was a dominating feature, and in a few this locality was the only site of attachment of polyps, which, when large, hung toward the naso-pharynx. A recurrence of asthma, after long abeyance, was observed to take place under the excitation of or in conjunction with an acute exacerbation of chronic sphenoiditis; and again in connection with a severe first attack of sphenoiditis. Also, having observed that the degree of benefit derivable from the surgical treatment of the nasal features of asthma is proportionate to the thoroughness of the operating, I have, of late years, supplemented former operative treatments by removing residual clusters of small polypi and polypoid hyperplasia when subsequently found in the spheno-ethmoid sulcus and within the sphenoid sinus, with the effect of gaining a further distinct reduction in the patient's residual asthmatic tendency.

Treatment—The dominant principle of the treatment of suppurative sphenoiditis is free drainage, or if not free, then as nearly so as may be consistently possible. In this alternative lies the difference between the palliative and radical treatment and the distinction between a dangerous and a safe operation.

The palliative treatment, which, for the milder cases, may prove to be curative in a limited sense, is based on the principle that if the posterior nares and naso-pharynx be kept clear of accumulated sphenoid discharge, the catarrhal symptoms and irritation exterior to the sphenoid outlet will tend to subside

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and the sphenoid drainage be improved in so far as swelling of the nasal tissue outside the sinus had impeded it. The same principle must have pertained to the amelioration of symptoms secured in the past through the restoration of nasal space by means of cauterization of the middle turbinal, middle turbinectomy and correction of septal deformities, for it is certain that in the years before we gave consideration to suppurative sphenoiditis as the cause, our treatment of the symptoms was not wholly fruitless. As the cleansing process must be long and regularly maintained, it is essential to instruct the patient in the self-application of a simple but efficient method, requirements which, in this affection, are met by the post-nasal type of douche rather than by an atomizer or anterior douche; and by an alkaline vaso-constrictor solution, weak enough to be devoid of irritating effect, rather than by strong astringent or antiseptic fluids; e. g.:

Menthol	0.2
Olei Eucalypti	1.
Olei Caultheriae	1.
Sodii carbonatis (not bicarb.)	4.
Sodii boratis	4.
Glycerini	30.
Aquae dist., q. s. ad	100.

M. et Sig. Dilute by adding one teaspoonful to one-half glass of water (1 to 25) for use as a post-nasal wash.

Irrigation of the sinus, already described as a diagnostic test, is serviceable as a remedy, especially during acute exacerbations. The exhaust method of evacuating the sinus is simpler, but not always as efficient.

The radical treatment is necessarily surgical and the approach to the sphenoid sinus may be made by one of three routes:

1. Through the natural channel of the nose, augmented in breadth by middle turbinectomy—the preferable route when disease of the spheno-ethmoid group is the major element.

Twenty-four intranasal operations, all by this route, on seventeen private patients, have embraced the following:

(a) Operative enlargement of the osteum sphenoidale by curette or evulsor supplemented by removal of polyps and polypoid tissue from the sphenoid sinus and other

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parts—five times on four patients, on account of asthma, recurrent bronchitis and catarrhal symptoms.

(b) Excision of a portion of the anterior sphenoid wall, but without embracing the post-ethmoid cells—four times on three patients for similar reasons.

(c) Reasonably complete Hajek operation, which consists of ablation of the post-ethmoid cell and removal of the party wall between it and the sphenoid, thus providing permanently the largest feasible outlet for the sphenoid sinus—seven times on four patients, respect-

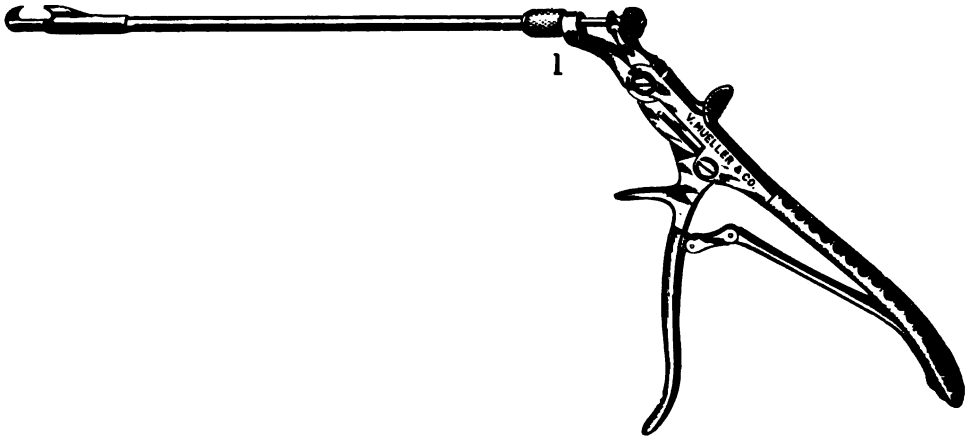

Fig. 3.

Casselberry's spheno-ethmoid bone cutter—an adaptation of the author's bronchoscopic pin-cutter, to fill the need of an instrument with power and rigidity to cut bone at long range in narrow quarters and leave room for light and vision. A tubular punch forceps in the form of a double sharp hook from the grasp of which bone cannot slip and whose bite, though narrow, is clean cut. For the primary puncture of a cell its distal blade serves as a Hajek hook, but on closure it cuts instead of tearing away the cell wall, being capable of excising several pieces in succession without withdrawal to detach each piece. It is intended to be supplemented by instruments of larger grasp when space has been made available.

ively, for mental daze, asthma with polyps, atrophic disease and headache.

(d) Partial Hajek operation, nine times on seven patients, for similar and additional reasons, including headache, migraine, exophthalmos and post-nasal discharge.

Although occasionally I have deemed it expedient to operate under general ether narcosis, as a rule only local anesthesia is

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employed, which obviates the need of a time limit. The patient, after realizing that he is not being hurt, sits contentedly, somewhat reclining, on a table which is adjustable, at need, for the recumbent position without interruption of the operation. Free immediate hemorrhage, encountered but once, from a septal branch of the naso-palatine artery which crosses the sphenoid wall, was controlled by solid nitrate of silver and temporary compression, secondary hemorrhage being prevented by the use, always, during the first night, of the author's rubber tampon.

Several, classed as "partial Hajek operations," were, in fact, completed to the extent designed, not having been intended for typical Hajek procedures. In others, however, the operating was discontinued short of the desired extent in obedience to a self-imposed rule of safety, which is to safeguard the nearby vital centres by stopping the operation whenever, by confusion or disappearance of surrounding landmarks the precise anatomical relations can no longer be determined; for, not only are the cells and other guiding features of the ethmoid labyrinth subject to variation in conformation and arrangement, but some of them will have been removed in the course of the operation which lends a different aspect to the rest. Resection of the middle turbinal is necessarily the first step, and the bulla, with other anterior ethmoid cells, if found diseased, are also eliminated on the way to the posterior group and then the convex median wall of the group of post-ethmoid cells comes into view. I call it the back-bulla, as keeping this resemblance in mind is an aid in distinguishing it in the fore-shortened perspective from a ledge-like remnant of the middle turbinal. The post-ethmoid group is dealt with as one structure, for one cannot know nor is it essential to know how many individual cells it may contain until it is laid open, which for the purpose classed as a "reasonably complete Hajek operation" involves removal of approximately the lower median quarter-section of the whole group together with a corresponding portion of the spheno-ethmoid party wall, thus forming an aperture into the sphenoid sinus capable then of further enlargement. When the antrum is jointly affected and has not previously been operated it can be freely opened through the middle meatus as an incident of the

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same operation, with the reservation, however, that additional drainage through the inferior meatus may be required.

The second and third routes to the sphenoid sinus are not under present consideration, but may be mentioned as follows:

2. Through the mouth and upper jaw, across the antrum, to the sphenoid recess in the nose, and thence to the sinus—preferable, among other conditions, when disease of the antrum is the major element and of a nature to indicate this particular operation.

3. Through the orbit and adjoining side of the external nose—preferable, among other conditions, when the frontal sinus is the major element.

I have experienced no accidents nor any harmful effects whatever consequent upon the spheno-ethmoid operation, a fact attributable to the rule of safety together with the avoidance of hurry and display. Nor has observance of the rule impaired the final results, which have averaged fully up to expectations; for when necessary the main operation has been supplemented by minor measures during the after treatment.

What are the end results or to what extent will the sphenoid wall and post-ethmoid cells be regenerated to reassume their poor estate? In the exudative diathesis, to an astonishing extent, so that three months later one might scarcely know the cells had been opened. Therefore, not infrequently, one must excise the equivalent of another quarter section or more; but eventually they do remain widely open, and when the anterior group has been jointly operated the remains of the cells form a vaulted nasal roof, as if supported by a series of Gothic arches. It is not always essential to one's purpose to attain this ideal result, but by watchfulness and persistency it always is attainable.

Are the patients then cured? If cure shall be defined as a total suppression of disordered secretion and other symptoms, it can be said to follow only when the focus of infection is exceptionally limited and accessible. But to approximate ordinary conditions, a less rigid standard of cure will suffice, few individuals being altogether free from disordered secretion. If then nine-tenths or more of the distress and disability incidental to the post-nasal discharge be eliminated, material mitigation of the

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asthmatic feature afforded and the headache with possible mental deterioration wholly remedied, it amounts to a practical cure. In this sense a large majority of spheno post-ethmoid sinus infections of the attenuated types specified are curable by the methods described. Arduous, painstaking effort and perseverance may be requisite, but the results are well worth while.

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FOREIGN BODIES IN THE ANTRUM.

BY JAMES E. NEWCOMB, M.D.

The history of a personal case may be briefly told. Some five or six years ago a man of middle life, druggist, was referred to me on account of a nasal and post-nasal discharge. He was suffering at the time also from pulmonary tuberculosis. Examination revealed a crusty, purulent discharge in the naso-pharynx, nothing more. He was not trans-illuminated at the time. I ordered the usual therapy and did not see him again until several months later, when he returned unimproved. Trans-illumination at the second visit revealed a marked opacity over the left antrum. An absence of some teeth on the affected side, among others, that of the first molar, as I recall, gave the opportunity of drilling through the alveolus and the insertion of a Myles rubber tube. This was closed with a wooden plug. The patient's general condition was on the down grade and did not in my judgment warrant a more extensive procedure. He returned several times for treatment, feeling considerable relief in his nasal condition. He was a very nervous man and was constantly working on the tube and plug with the end of his tongue.

On one occasion, while in the examining room, the tube and plug suddenly disappeared. Both of us thought that it had fallen out and was somewhere on the floor. A careful search, however, failed to find it, and I was forced to the conclusion that the apparatus had been forced en masse into the antrum. Prolonged search with a slender forceps through the alveolus failed to find it, although apparently every part of the antrum was explored. A skiagram by Dr. Caldwell, of our city, gave no evidence of its presence. The patient bore all the necessary manipulations very badly, was advised to keep the cavity clean and to report at intervals. Apparently the presence of the tube and plug in the cavity, assuming that it was really there, did not increase the amount of discharge nor the man's discomfort.

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I hoped that an improvement in the general condition and his increased stamina would in time permit of the renewal of the search.

At this time he went to the Catskills for the Summer. The rest of the history is based on the patient's statements on his return in the Fall. He said that after his arrival in the mountains he improved sufficiently to permit a dental student whom he met there, to whom he confided his history and to whom he mentioned our suspicions as to the presence of the foreign body in the antrum, to renew the search for it. In the course of time he said the dental student succeeded where I had failed and with the same instrument previously employed. He succeeded in removing the tube first and later the plug. This happy result did not apparently affect the amount of discharge nor the later progress of the patient's symptoms. His later history was that of the invasion of the larynx by the tuberculous process and death from the general disease in a short time. During the last week of his life he was not under my care.

At that time I wondered if such accidents were of frequent occurrence, and I began to note in my index the report of similar occurrences. On going over this index, supplemented by the volumes of the Centralblatt f. Laryngologie, from 1891 to 1910, I have found fifty cases of foreign bodies in the antrum reported by forty-six observers. The list is appended to this paper. There have been other papers on the general topic of foreign bodies in sinuses, but the cases reported have been all the authentic ones I have been able to find involving the antrum. Naturally the body most often found has been some form of tube or canula, viz., 16. Of teeth and tooth roots there have been 13; bullets, 6; rubber tubes, 5; gauze compresses, 2; pipe stems, 2, and one each of cotton, piece of paper, and wood, toothpick, straw, rubber nipple, metal bolt, obturator, glass, peg, and piece of a broken trochar.

Some of them have given symptoms immediately following the accident which gave rise to their introduction. In some no symptoms whatever have followed.

Only one writer, Razemon, has attempted any collation of the nature of these bodies. In 1910 he referred to twenty-nine

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cases, ten of which were teeth, calculi or bony sequestra, nine projectiles of various kinds, while ten were discovered in the after-treatment of operative cases. In some the mode of introduction was, according to the patients' statements, unknown. In others there had been manifest antecedent disease, and the foreign matter did not impress on the case any additional symptoms.

In ten cases skiagrams were taken. Results were positive in seven. Of this number rubber drainage tube and bullet were responsible for two. In the remaining five the nature of the body is not stated. In the case reported by Ogilvie and Davidson, a bullet in the antrum was located by means of a telephone, as has been frequently done in cases of bullet wounds in deeper portions of the body. Macintire reports the case of a patient who had worn a tube for some time, but there was a history of her having previously lost a tube. The discharge from the antrum had practically ceased when the introduction of a new tube was followed by an increase in the amount of pus through the naris of the same side. The fluoroscopic screen at once revealed the presence of the old tube in the maxillary sinus.

Perhaps the most remarkable case showing the tolerance of foreign bodies is the one reported by McReynolds in 1908. The title of his contribution is "Retention in the Maxillary Antrum of an iron bolt, three-eighths of an inch in thickness and one and five-eighths inches in length for a period of four years without important symptoms." In 1903 his patient, a man of thirty-six years, was thrown forcibly against the lock of a screen door, inflicting a wound along the infra-orbital ridge, but not affecting the eye. The attending physician did not apprehend that the subjacent bone had been injured, still less that any foreign body had been retained, and closed the superficial wound, which healed promptly. Two years later two posterior molar teeth of the upper jaw of the same side became loose, and the looseness became more evident, so that the patient, four years after the original injury, pulled them out with his fingers, whereupon a hard body presented at the alveolar opening. This proved to be the missing bolt from the lock of the door, for which a search had been made at the time, but, of course, without success.

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During these four years the patient had had only slight and temporary trouble from what he termed "neuralgia."

Several of the reporters have called attention to the careless way in which the flange is soldered to the tube in many of the silver cannulae in common use. After a while the flange becomes worn and loosened, so that it is broken off and the tube slips back into the antral cavity. They call attention also to the superiority of gold tubes, which either are made in one piece or more carefully constructed, so that such accidents as the one referred to are far less likely to happen. In one case a tooth root was found in a dental cyst. All sorts of curious and interesting facts have come to light in a study of these cases.

Treatment.—By whatever diagnostic means a foreign body is located in the antrum, the rational procedure in case it cannot be withdrawn through a natural opening or a tooth socket is to open the antrum through the canine fossa, thoroughly explore the cavity with a small electric lamp, locate any body and remove it, giving at the same time such sinus treatment as the individual case may seem to indicate. In several instances skiagrams have shown the body lying wedged in a forward bulging of the antral wall, so far forward that a forceps passed through a tooth socket could not reach it until it might in some way become dislodged and come within grasp. I surmise that was the condition in my own case. It is interesting to note that in some cases the X-Ray located rubber tubes, though it failed so to do in the present instance.

Finally it may be noted that in some cases the vigorous irrigation of an antrum through a tooth socket has driven a foreign body, especially pieces of gauze; against the opening in the hiatus semillunaris, or even out into the fossa of the naris, whence it was easily extracted. The use of aspiration has been similarly successful.

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Discussion on the Papers of Dr. Richards, Dr. Casselberry and Dr. Newcomb.

Dr. James E. Logan: Dr. Richards has presented a very interesting and statistical paper. It presents the subject of sinus surgery in a very conservative manner, and I am glad to see Dr. Richards conservative.

Dr. Casselberry's paper is an interesting one and deals with the subject very common in practice but very complex in pathology. I fail to comprehend entirely his meaning of "attenuated types" of sphenoidal or ethmodial suppuration, but I do agree with him in regard to the method of procedure. In the light of my experience wherever suppuration exists drainage is absolutely demanded at the earliest possible moment. I cannot help but believe that many of the cases referred to by Dr. Casselberry are the results of diseased lymphoid tissue in the vault of the pharynx. In my experience the removal of this diseased mass relieves many distressing nasal, post-nasal and aural conditions which I have previously regarded as sinus involvements.

Dr. J. Price-Brown: I would like to refer to two cases of frontal sinus disease reported to this association three years ago. In both of these I did an external operation into the frontal sinus and made drainage through the nose. In the first case I used a gold tube, but I could not retain the tube because I could not syringe the parts through the tube. After the tube was in for a week or ten days I took it out by another operation through the eyebrow. Then I put in a large rubber tube, which was inserted from above and came out through the nose. I syringed it for a certain time and then took it away. The patient made a good recovery, with very slight deformity, and two months ago there was no return of the discharge. The other case was a man who had the same operation with section of the frontal sinus upward so as to get room for a large ¼-inch rubber tube. This was left in for a length of time. I also saw him a few months ago and there has been no return.

With regard to foreign bodies in the antrum, I reported a case some years ago with two foreign bodies in this position. I did most of my operations on the antrum through the alveolus at that time, but not now. In this case I instructed the patient to put in a plug, which he did one night, and in the morning he could not

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find it, and did not know but what he might have swallowed it. The next night he put in another and also lost that. I therefore instituted a search, opened the wall through the canine fossa, and removed both the plugs, which had slipped into the antrum.

Dr. A. C. Getchell: I would like to mention two cases of foreign bodies. My recollection of one case is that the tube finally appeared in the nose. The other was a recent case of a young girl who came for advice about a year ago, with evident inflammation of the bone about a tooth. I referred her back to the dentist. She came again a month or so ago, and there was then suppuration of the maxillary antrum and the operation was through the canine fossa with a counter opening in the nose. A plug was found in the antrum. This was removed, and recovery was satisfactory.

Dr. George L. Richards (in closing): Some years ago we were told that every bit of mucous membrane must come out in these cases of inflammation in the sinuses, and I am glad to see that the pendulum is swinging the other way. I am one of those who believe that most of the antrum cases should be cured by large openings intra-nasally. With the frontal sinus I try to let Nature provide gravity drainage. If you can maintain a nasal opening, sooner or later it will get well. In most of the cases if the anterior portion of the sinus remained and the nasal opening was kept patulous recovery followed. In women it is certainly preferable to an external opening. Thirty-three per cent of my cases were chronic and in 18% the operation was an external one. In the second series of the same line of cases I cured more intra-nasally. Dr. Koehlreuter, of Karlsruhe, formerly with Professor Killian, has practically abandoned external operations. During the time I spent at Professor Killian's clinics he operated on but two cases externally, which is an extremely small percentage considering the number of cases coming to the clinic. I am sure we are all in favor of intra-nasal treatment where indicated, the maintaining of natural drainage—the getting nearer to Nature's processes—which is gravity drainage. Of course, cases occur which cannot be cured intra-nasally, and these must be operated on by some form of external operation.

Dr. J. F. Barnhill: I wish to agree with Dr. Casselberry concerning the diagnosis and treatment and the necessity for the treatment which he outlines. He has, however, not told us exactly how he does these things, that is, he has not given us the details of his technique. Writers in general speak of removing the ethmoid cells by curettage, or other means, as though it were the easiest thing in the world to do. Dr. Casselberry says, in speaking of the removal of the anterior ethmoidal cells and en-

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tering the sphenoidal cavity, that he does not work longer than he is able to see the anatomical parts clearly. This is wise, but all of us find that almost as soon as we begin on these cases in an operative way it is difficult to see the parts; a few drops of blood in this region, especially with the patient under a general anesthetic, will so block the way that it is practically impossible to see anything.

I very much believe in the plan that Dr. Coakley has outlined, giving the external operation as a choice, although I do not believe these cases Dr. Casselberry speaks of are sufficiently grave to require external operation. In grave cases, however, it is to be preferred to the intra-nasal route, for we do see better what we are doing and accomplish our end more perfectly.

I also wish to second Dr. Coakley's remarks regarding Dr. Makuen's case. I believe if possible in the complete obliteration of the sinus, and if drainage only is to be secured, it is not wise to make any sort of curettage of the interior of the cavity, because, as he says, the new granulations cause a worse condition than at first existed. Either do one thing thoroughly, that is obliterate the sinus, or else be satisfied with simple drainage.

Dr. Greenfield Sluder: Relative to Dr. Newcomb's paper—I would like to add to the list of cases already mentioned to-day in this connection two cases that, I fancy, should be considered as foreign bodies in the antrum. They were masses of bismuth paste which had been injected therapeutically, but which did not flow out. They became hard and offensive and remained—one for two years and one for a year and a half. They were removed only when the antrum was opened.

Concerning Dr. Richards' paper: The doctor makes the statement that at one stage of the case the pain was continued, not by suppuration, but by closing of the outlet accompanied by expansion of the gases contained in the sinus. I assume that that was not an inflammatory condition or the result of decomposition—that it was air confined in the cavity. If I be right in this, then I too have considered this same problem—this origin of pain, in a paper read with Dr. Ewing before the American Ophthalmological Society in 1900, describing various ways in which the closure of the sinus was brought about with symptoms subsequent thereto—especially ocular symptoms. I ascribed the pain, however, not to expansion of the air confined in the sinus, but to absorption of some of its volume—the oxygen—thereby producing a negative pressure instead of a positive pressure. I construed it as a vacuum headache.

In connection with Dr. Casselberry's paper I should like to narrate, very briefly, the history of a case of sphenoidal-post-

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ethmoidal inflammation accompanied by a very high grade mental distress, because it bears out some of the points emphasized by the essayist. A lawyer, considered to be quite learned, very energetic and of normal disposition, after six months' duration of severe posterior headache, drowsiness, dizziness, mental obfuscation and inability, accompanied by the profoundest melancholy, became helpless as far as his practice was concerned. He believed he was losing his mind. His friends and family feared self-destruction. The diagnosis of sphenoidal-post-ethmoidal inflammation was made at this time. With the betterment of the local disease his symptoms all grew less severe and ended in recovery after ten weeks, to reappear five months later in lesser intensity, from a mild coryza. He recovered from this reinfection in about three weeks.

Dr. G. Hudson Makuen: I would like to report in this connection an operation performed three weeks ago upon the frontal sinus for the relief of chronic empyema. The operation followed a similar one upon the antrum and sphenoid sinus of the same side. It had some features which I have not seen mentioned in the literature, and the particular one to which I desire to call your attention was suggested to me by Dr. Walter J. Freeman, of this city.

After removing the diseased pulpy debris through a small opening in the anterior wall, and enlarging somewhat the nasofrontal duct, a gold tube, devised by Dr. Freeman, was placed from above downward and clamped at its upper extremity. The sinus was loosely packed with iodoform gauze, the end of which was made to protrude through the gold tube into the nasal chamber, and the anterior wound through the eyebrow was closed. At the end of five days in attempting to remove the packing through the nose, the tube came away with it, because the tube was too small for the opening and had not sufficient anchorage at its distal extremity. One of Ingall's tubes was then inserted through the duct, and the man has been wearing it for about two weeks with apparently satisfactory drainage. I am pleased to present the patient for your inspection, and you will observe that there is now, after only three weeks, but little scar. The discharge is gradually growing less and there is absolutely no odor to it. When it has ceased, if it does cease, it will be a simple matter to remove the tube.

I would also like to mention a case of foreign body in the antrum, which occurred in a very curious way by an accident for which I was myself largely responsible. After a Caldwell-Luc operation upon the antrum, the cavity was packed with a long, narrow strip of gauze, which was left protruding through the

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nasal opening, the opening into the mouth being closed. At the end of five days I attempted to remove the gauze through the nasal opening, and to my surprise and consternation I found that it had disintegrated and that it would not bear the stress of removal. It was with great difficulty that I secured a portion of it with curved forceps, and I was in some doubt as to whether I had gotten it all. I said nothing to the patient about it, for I thought that if, as I feared, some of it were left, it might come away in the syringing of the cavity through the large opening in the nose. But in this I was disappointed, for the suppuration of the cavity increased, and the odor became worse than it had been during all the four or five years of its existence. Severe pain was also complained of in the antral region, and the condition of the patient was altogether bad. Two weeks after the original operation I was obliged to reopen the cavity through the canine fossa, and I found it completely filled with foul granulations, held together in the meshes of the gauze that had remained. The operation was practically a repetition of the former one, except that I was particular to test the tensile strength of my gauze packing before introducing it, a thing which I think I shall always do in the future.

Dr. G. Hudson Makuen: The patient which I exhibited yesterday had chronic suppuration of all the accessory sinuses on the left side. A Caldwell-Luc antral operation was performed during the previous year and the entire mucous membrane lining the cavity was found to be in a state of disintegration. A complete curettement of such a cavity, under these conditions, would be difficult, even if desirable, and I suppose that a sufficient amount of mucous membrane is generally left from which healthy granulation tissue may arise. In this case, I suppose, an amount of foul disintegrated tissue sufficient to fill a small size tea cup was removed. It would scarcely seem to me to be good surgery to leave this diseased tissue in a suppurating cavity of this kind, and I may say that the antrum seems now to be completely filled with healthy granulation tissue, and there is no discharge from it whatsoever. A similar operation was done upon the sphenoidal sinus, which is also entirely well and apparently filled with healthy granulations. The frontal sinus was in a condition similar to the antral and sphenoidal sinuses, and my operation upon it was of the same character.

Dr. Cornelius G. Coakley: Dr. Richards' paper is one that I think we can all study with profit, especially the statistics of his results. There was one part which I did not gather from his paper, namely, that out of his cases 80% were cured without intra-nasal operation, and 20% needed external operative pro-

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cedures to effect a cure. The interesting part is not the percentage of acute cases, as the opinion of most of us is that it is rare to operate on an acute frontal sinus unless there is edema around the orbit, that is, a perforation into the orbit, requiring such operation. But the interesting part was the percentage of which these cases were made up.

I was very much interested in Dr. Casselberry's paper. There is one part in his diagnosis I would like to speak about. As I understand him, Dr. Casselberry uses his catheter probe for testing the quality of the mucous membrane lining the sphenoidal cavity and when he elicits a metallic click he concludes that the mucous membrane is thin. I want to say that in my opinion this is not a good deduction, because the portion of the mucous membrane that one can examine is the upper portion of the vault, which oftentimes does not show disease, and when the cavity is opened an enormously thickened mucous membrane may be present. I am glad to hear Dr. Casselberry say that some of the symptoms, especially the pain, is relieved by his intra-nasal operation, and also to say that he has difficulty in keeping the sphenoidal orifice open. I find it extremely difficult, and in all but a few cases where I have made an opening in the sphenoid by any intranasal method that I feel safe to use, where the opening will remain patulous for some three, four or five months, these patients go from under my care with a good-sized opening, one considerably larger at the end of a month, and they will return three months later and the opening will only admit an ordinary sized probe. If it becomes infected later they will have all their symptoms return and it will be necessary to reopen the cavity. The lower portion of the anterior wall is enormously thick in many cases of sphenoidal disease, and I do not know of any chisel, or anything but a dental drill, which I am loathe to use in the nose, of any way to get rid of the enormously thick bone we find. On the other hand, I believe where the disease warrants it, where the anterior middle and posterior cells are the site of extensive disease, the most thorough way of getting at the disease of the sphenoid and posterior ethmoid is by an operation under a general anesthetic where the incision is made alongside the nose, and you can break out with bone-cutting forceps a portion of the inferior wall and the whole of the anterior wall. These openings are much more easily kept under control, and in very extensive disease and with rapidly recurring contraction of that opening, the best is the external route for these cases.

With regard to Dr. Makuen's case, there was thorough curettage of the sinus. In my opinion you should not disturb the mucous membrane any more than possible, because if you do, the

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minute you cut away the bulk of that mucous membrane, or take it all away, the cavity will fill up with granulation tissue, and this will leave pockets, and in these pus forms. The chance of cure with the complete removal of all the mucous membrane is very little, and it seems to me a bad type of operation. We must either restore drainage to a frontal sinus to let Nature take her course, or else we must obliterate it absolutely.

Dr. Robert C. Myles: You will all remember that on several occasions from year to year I have contended that a large opening can be obtained in any septic sinus without curettage. I do not advise curettage for the simple reason that you destroy the mucosa over the periosteum and the bone then dies. So if we propose to enter any sinus, unless we can make a large opening for future drainage, it is best to obliterate the sinus by that method which carries with it the least mortality. We do not hear of deaths due to these operations—they are not reported, but this is very important in regard to the various methods of procedure. If by one operation you can obtain as satisfactory results as another, and one carries with it a large mortality, by all means choose the other method, although there may be some minor disadvantages.

In internal operations on the frontal sinus I have always had to remove the nasal processes of the superior maxillary bone, and it is very difficult, and I can only do it with a chisel and hammer. I never curette the frontal sinus.

If those reading papers would define the technique in the different cases it would be of great benefit to us all, for there are many difficulties to be encountered from hemorrhage, from the cutting of nerves and other accidents.

Dr. W. E. Casselberry: It was because of the liability, almost the certainty, in time of an antrum drainage tube placed through the alveolus and worn indefinitely being broken and escaping into the sinus that caused me to relinquish entirely this method of treatment of the maxillary sinus. Exceptionally a recovery occurs in too short a time for the tube to disintegrate, but commonly the patient will wear it year in and year out, disregarding advice of doctor and dentist, and giving it no attention until the tube breaks, when the chances are even for part of it passing up to be lost in the cavity of the antrum. A much better method is to make an opening as large as practicable through the nasal wall in the lower meatus. When done as an incident of my spheno-ethmoid operation, which itself requires a middle turbinectomy, I make the antrum opening, if any, through the middle meatus and find it satisfactory. If neither nasal route is sufficient I advise the radical canine fossa operation. I may say further, if one does have occasion to perforate the alveolus one can avoid putting

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in a tube, but enlarging the opening from time to time when it contracts.

Dr. Casselberry (in closing): With the exception of the misunderstanding regarding the significance of the "sphenoid click" I feel that every point raised is a question naturally open to discussion or valid criticism. All are features to which I had previously given thought, pro and con, for I have been following the subject of sphenoid sinus disease with the spirit of the chase for the last three years, and have encountered the very questions and complications which have been raised in discussion of my paper. The "sphenoid click" I described, I think, for the first time, but merely as evidence in confirmation of the presence of the probe in the sinus, not as indicating any disease, or thickness or thinness of bone; in fact, I warned against interpreting it to mean dead bone or disease. The statement that the probe does not reach the lower part of the sinus at all is true, as a rule, but has little bearing on the "sphenoid click," for the probe might touch a raphe anywhere in the sinus. However, other parts of the sphenoid wall, within, are equally thin, resonant and thinly covered, contact with which would explain the "click" as well as the raphe. It is the fact of the "sphenoid click" and not particularly an explanation of the fact which I seek to bring out.

With regard to the opening: This does close, and the only way I have been able to overcome the tendency has been to operate through the post-ethmoidal group of cells, obliterating at first a quarter section of the whole group and then later, perhaps, the equivalent of another quarter section. If one aims to take out, instead, the thick bone at the base it is much more difficult, hence the route through the ethmoid cell adjoining the sphenoid, where the bone is thin. Even so, many cases tend to close, although it never closes entirely. Then I open it again without the necessity of going through all the same effort as at the first operation, because there is now more space, and I reopen and re-enlarge the opening simply as a supplementary operative treatment. Finally, although the opening never stays as wide as at the start, it remains large enough.

With respect to the external operation: there are a few cases in my list for which, had I to operate on them again from the start, I would advise external instead of intra-nasal method. It would have attained the result more quickly and with less effort, but with more risk. However, the majority of the cases in my group are specified as attenuated types and were conditions for which the class of operation mentioned by Dr. Coakley would have been impracticable and in most of them inappropriate.

With regard to Dr. Logan's remarks I excluded post-nasal discharge due to adenoid tissue. I quite agree with him regarding it.

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TYPICAL POST-NASAL FIBROMAS AND THEIR SPONTANEOUS DISAPPEARANCE, WITH THE REPORT OF CASE.

BY NORVAL H. PIERCE, M.D.

Some temerity is required to again bring this subject before you after the masterly manner in which such distinguished members of the American Laryngological Association as Lincoln and Delavan have dealt with it in the past. My aim in doing so is to record a case and to refresh the mind as to facts which there is reason to believe are quite generally disregarded or forgotten.

True post-nasal fibromas constitute by their site of origin, histological characteristics and clinical course a well defined pathological entity.

The true post-nasal fibromas have been termed "typical" as distinguished from atypical, false or pseudo-post-nasal polyps, i. e., polypoid tumors originating primarily in some neighboring cavity and secondarily growing into the post-nasal space. Bench, whose classical chapter on these growths appears in Vollotini's Krankheit der Nase, divides the typical post-nasal fibromas into two classes: those growing from the fibro-cartilago-basilaris, from the upper cervical vertebra, and from the lamina interna of the pterygoid process; to these he applies the term intra-pharyngeal fibromas. To those growing from the foramen lacerum anticum or from the fossa spheno-palatina he applies the term extra-pharyngeal.

The most usual point of origin is the upper and posterior wall of the pharynx; that is to say, the inferior surface of the body of the sphenoid and the basilar process of the occipital bone. Not so frequently they spring from the lamina interna, the processus pterygoidus, the fibro-cartilago-basilaris which closes the foramen lacerum anticum, from the anterior surface of the cervical vertebra and from the fossa spheno-palatina. They do not originate in the mucous membrane nor from the

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submucous connective tissue of these regions, but from the periosteum itself.

A post-nasal fibroma has but one base of origin and is never multiple. Its body may be so large as to reach from the basilar process to the larynx, and from this body it sends processes, or limbs, which, in their growth, follow the lines of least resistance, namely, the neighboring apertures, fissures and foramina, destroying by pressure atrophy the bony structures that obstruct its progress or pushing them aside. Thus it may send an offshoot into one or both choanae, which, pushing the septum to one side or destroying it by pressure, may completely fill the nasal chambers and appear at the external aperture, or, as frequently happens, one of these processes may penetrate the fossa pterygo-palatina, appearing as a swelling in the temporal fossa in the region of the zygoma, or by way of the foramen spheno-palatinum, it may occupy the sphenoid cavity or the antrum maxillare, and lastly, by way of the fissura orbitalis inferior, it may penetrate the orbit. It may invade the cranial cavity by destroying the lamina cribrosa of the ethmoid, or by way of the foramen lacerum anticum. The formation of these arms, or processes, is characteristic of these tumors. Lannelongue exhibited to the Paris Surgical Society in 1873 a specimen with eight processes. Wherever the body of the tumor or its processes rubs against a surface of sufficient density to stay its growth for a time, the epithelium of the opposing surface is apt to be destroyed and an ulcer formed. At these points firm adhesions occur between the tumor and neighboring parts. The difficulty with which these adhesions are broken down and the hemorrhage incident thereto have given rise to two errors: First, that the growth may have multiple points of origin, and, second, that the growth may draw its nourishment from these points.

The typical post-nasal fibromas constitute the most common form of neoplasms in this region. They occur, if not exclusively, at least by far most frequently in the male between the age of ten and twenty-five years. Cases have been reported under ten (Verneul, Chappy) and over thirty (Robin-Macé).

The ten cases which have come under my observation oc-

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curred in males and, with the exception of the case to be reported, between the ages of ten and twenty-five years.

On microscopic examination we usually find the characteristic structure of a hard fibroma containing elastic tissue. It consists of thick bunches of connective tissue fibrillae, which often are concentrically arranged around the nerves and vessels; connective tissue cells are as a rule infrequently present, but occasionally nests of embryonal connective tissue, are to be found, especially in the youngest portions of the growth, in such abundance as to give the impression of a sarcomatous growth. Indeed, these growths have been classed as fibro-sarcomas. This error is easily understood when we take into consideration, along with the presence of considerable fibroplastic substance, their frequent recurrence, their rapid growth, their power of destroying bone, and their oftentimes fatal course. But they never produce metastasis; they destroy the osseous tissue which surrounds them by pressure, not by infiltration, and they do not cause cachexia.

Their vascularity varies greatly, though, as a rule, they are richly supplied with both arteries and veins throughout. Especially at the base of the tumor is this vascularity most marked, where the arteries may reach the size of that of the maxillaris interna. Infrequently the vascularity is so rich that it assumes the character of cavernous tissue; such a tumor may be compressed like a sponge and then resumes its previous shape and size as soon as pressure is removed. (V. Langenbeck.) These vessels frequently have an embryonal character, lacking the normal number of coats, so that their adventitia is in intimate relation with the hard fibrous tissue which surrounds them. They are, therefore, unable to collapse or contract, and a thrombus forms with difficulty, a fact which contributes to the occurrence of the enormous and uncontrollable hemorrhage which occasionally occurs in the clinical course of these tumors. Cysts, calcareous deposits, bone and cartilage have been found in these tumors. The fatty degeneration of the spindle-shaped connective tissue cells which has been observed is regarded as a sign of involution. The tumor is covered with a pale bluish red or red mucous membrane, which is analogous to normal mucosa of the pharynx. The color and density of the growth are indices

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of its vascularity. They are not markedly polypoid, however, but grow from a rather broad base.

Pathogenesis—The theories advanced by Bench, Denonbaix and others as to their etiology are, to my mind, insufficient and, therefore, unconvincing. Not infrequently there is a history of trauma. That they are found almost exclusively in the years of puberty would indicate that they are connected with the formative processes going on at the base of the skull, and this likelihood is still further borne out by two additional facts: that they occur by far most frequently in males whose skulls are the seat of more active developmental energy than is the case in the female skull, and that they have a tendency to undergo involution after these processes cease. That there must be some ultimate, actual etiological factor is proved by the relative infrequency of their occurrence, and this ultimate factor may be found in abnormal craneo-pharyngeal duct inclusions. Moure regards the growth as of inflammatory origin and due to infection.

Clinical Course and Symptoms—Unfortunately we rarely see these cases at an early period of their growth. Only when they obstruct nasal respiration or are large enough to change the timbre of the voice do these unfortunates seek the physician's aid. The first symptom of an extra-pharyngeal fibroma may be a neuralgia of the second branch of the trigeminus from pressure on the Gasserian ganglion.

The diagnosis in the early stages of the tumor may be best made by posterior rhinoscopy, and the same holds good as regards post-nasal surgical procedures for its eradication. These two facts are enough on which to base the claim that the post-nasal fibromas belong to the specialist's domain.

Besides the nasal stoppage and changes in the character of the voice (rhinolalia clausa posterior), the most characteristic symptom, after the tumor has reached a size sufficient to undergo decubitus ulcerations from contact with the bony framework of the post-nasal space, is hemorrhage. These hemorrhages are, as a rule, profuse, and may frequently be so grave as to threaten life. On account of their frequent repetition,

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these patients suffer from extreme anemia, which produces mental sluggishness, sleepiness and changes in the unstriped muscular tissue, in consequence of which there frequently results a degeneration of the myocardium, a fact that must always be borne in mind when administering to these individuals local or general anesthetics. The decomposition of the nasal secretions and the ulcerative process which occurs when the growth fills the nose produces a putrid stench. As the growth develops it causes additional pressure symptoms—on the tuba Eustachii, causing changes in audition; in the pharynx, causing dysphagia and aphagia, dyspnoea and suffocation; in the temporal fossa interference with chewing and even dislocation of the mandible; in the orbita exophthalmos, amblyopia and amaurosis. Cerebral symptoms appear when the growth invades the cranial cavity, either through pressure absorption of the base of the skull or by one of the processes of the tumor growing into the communicating foramina. These symptoms consist of head pressure, slow pulse, oculo-motor paralysis, vomiting and vertigo; or a meningitis may develop, the bacterial invasion taking place by way of the pharynx. Death results seldom from brain complications, however. The exitus is usually the result of inanition, the sum of anemia, dysphagia and dyspnoea.

He who contemplates the suffering of one of these unfortunate victims must be touched with the deepest pity. A youth pallid and wasted from the recurrent hemorrhages, whose eating and drinking and breathing are accomplished only with the greatest difficulty, to whom night brings no surcease, but is spent in sleeplessness or fitful naps, from which he starts in suffocation, he is frequently, even in these days of enlightenment, left between one of two dread alternatives—death or a perilous external operation. Little wonder he chooses the latter.

Of the nine cases coming under my observation which were operated on by general surgeons but one recovered. Again I wish to make an earnest plea for early diagnosis. If this is accomplished the tumors may be removed, or at least held in check until the period of involution occurs, by simple measures carried out per via naturales.

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The hypothesis, first formulated by Legouest, that these tumors must undergo spontaneous involution, was founded on the fact that they are not observed after the age of thirty. The truth of this hypothesis had its first confirmation in the oft-quoted cases of Gosselin and Lafont. Gosselin's case is so vividly reported that I cannot refrain from presenting another excerpt, as quoted by Bench.

The patient was a male, twenty-two years old, with an extensive left-sided post-nasal fibroma, who, on account of dyspnoea and great loss of blood from recurrent hemorrhages and in spite of long continued treatment and repeated operations, was reduced to so hopeless a condition that Gosselin advised against further operative interference. A few days later an incomplete right-sided hemiplegia, accompanied by a right exophthalmos, developed. Feeling sure now that perforation of the base of the skull had occurred and that the tumor had invaded the cranial cavity, and that any operation commensurate with the extension of the tumor would only hasten the fatal end, Gosselin permitted the patient to leave the hospital on March 26, 1870. Gosselin says: "What was my great astonishment to have this young man return to see me again on February 16, 1871! I had not heard from him for a year and regarded him as dead. Such was not the case, however. He returned to inform me that since leaving the hospital his health had continually improved in spite of the excitement and privation to which he, with all others, had been subjected during the siege of Paris. The paresis of the right side, together with the exophthalmos, gradually disappeared, and no other cerebral disturbance appeared. Only once, five months after his discharge, was he treated in another hospital for a transient hemorrhage by medicinal measures. "On blowing the nose it was freely patulous for air. Examining the nose by daylight, I could no longer find the roundish red body I could see before. When he opened his mouth I noted the median division of the velum which had previously been made, but no tumor. The finger, exploring the post-nasal space, found the region as free as though no tumor had ever been present. The patient complained only of the nasal voice.

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which was caused by the cleft in the soft palate. Conceive a young man of twenty-two years whose death was imminent from a post-nasal polypus. A palliative procedure had delayed the fatal issue, and now at twenty-four and one-half years the tumor had spontaneously disappeared. It had been absorbed, not thrown off. The bony tissue of the orbital wall and base of the skull had been reformed. The pressure symptoms in relation to the eye and brain had disappeared. In short, the patient presented himself as cured."

La Font's case occurred in a young man twenty-four years old, who complained of nasal stoppage for three or four years. There had been frequent and copious nasal hemorrhages. The post-nasal space and the left nasal chamber were occupied by a hard tumor; the upper jaw was pushed forward. There were exophthalmos and epiphoria. An attempt was made to remove the tumor by way of the nose, but failed. Four and a half months later the facial asymmetry had disappeared, together with the exophthalmos and epiphoria. The velum had hitherto been pushed forward, but was now in its normal position, and the pharynx was free. Since these instances of spontaneous disappearance many others have been reported by:

Gosselin: Clinique Chirurgie de l'Hosp. de la Charite, 1873.
LaFont: Gaz. Hebdom., 1874, 37.
Huters: Deutscher Chirurgen Congress, 1879.
Poisson: Gaz. Med. de Nantes, 1889.
Rotter: Semons Centralblatt 6, S. 298.
Bouchard, Rev. d. Chirurg., 1890.
Cit. by Grunwald Monatschrift f. Ohren, 1891, S. 275.

To these I wish to add the following:

E. O'D., age 31, laborer, was admitted to the Illinois Eye and Ear Infirmary June 25, 1910. The patient is a tall, slim man, rather pale. He dates his trouble from April 11, 1910, when he fell from the third story (about 30 feet) of a building where he was engaged in window washing. The fall resulted in a bilateral Colles' fracture and a complete fracture of the skull in the frontal region, over the eye, and a fracture of the nose. For these injuries he was treated at St. Elizabeth's Hospital, from which he was discharged as cured. Since then the vision of the right eye has become more and more impaired.

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Eye Findings—The right pupil reacts to accommodation, but very sluggishly to light. Left pupil normal. Dr. Beard reports optic atrophy.

The patient complains of inability to breathe through the nose, and his voice is deadened (rhinolalia clausa posterior). Anterior rhinoscopy reveals a tumor of a bluish red color, with smooth surfaces projecting a short distance into both choanae. By post-nasal rhinoscopy a tumor is seen filling the post-nasal space and reaching the velum. The tumor has a smooth, glistening surface, is bluish red in color. Palpation reveals that it is hard and but very slightly movable, if at all. Examination with a probe leads to the belief that it is probably attached by a base only slightly smaller than the tumor to the posterior upper wall of the epipharynx, a little more to the left than to the right.

He gives no history of hemorrhage. There is a slight odor of foetid nasal discharge. In spite of the patient's denial of venereal disease, a Wassermann test was made with negative results.

For the purpose of removing the growth per via naturales, I gave orders for the construction of a special snare with a heavy post-nasal cannula. While waiting for the completion of this instrument the patient was given iodide of potassium, beginning with ten grains and increasing to forty-eight grains three times daily. As the snare was nearing completion I again examined the patient on July 9. To my great astonishment the tumor was much smaller in size. There was a well defined pedicle, which allowed the tumor to be moved. Subsequent examination revealed a steady diminution in the size of the growth.

It was especially interesting to observe the changes in its form during involution. Excepting that portion immediately below its attachment to the basilar process, the transverse diameter of the pedicle diminished much more rapidly than its length, so that at a certain period the tumor had somewhat the shape of an hour glass. This construction of the pedicle must have had the effect of shutting off the nutrition of the growth and may be regarded as a factor in its involution. The pedicle then rapidly contracted, together with the body, so that at length only a slightly nodular thickening remained at the site of origin.

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Differential diagnosis is accomplished with difficulty only in exceptional cases. Given a male between the ages of ten and twenty-five years, with the history of complte nasal stoppage and recurrent hemorrgages, with rhinolalia, and whose post-nasal space is occupied by a tumor having a smooth surface, with a swelling in the temporal region above and below the zygoma or in the masseter region, the diagnosis may be at once pronounced. Between sarcoma and post-nasal fibroma some difficulty may be experienced, especially in the early period of the development. It must be borne in mind, however, that sarcoma causes destruction of neighboring tissues by infiltration, while the fibroma invades by mechanical pressure. Histological examination of a portion of the growth itself or of enlarged cervical glands usually clears the diagnosis. Post-nasal retro-pharyngeal abcess, and the exceedingly rare occurrence of cerebral hernia through the foramen spheno-palatinum may be differentiated by aspiration; swollen lymph glands by their mobility under the mucosa. The fibromas of the rim of the choanae and the pseudo-post-nasal polypi are always markedly pedunculated, though they may also be accompanied by severe hemorrhage, and may form adhesions in the post-nasal space.

That the case reported in this paper was probably not of syphilitic nature is proven by the absence of history and all signs of previous manifestations of syphilis, the negative Wassermann, the shape, size, density, appearance, and the mode of involution of the tumor. Whether the administration of the iodide of potassium had any influence on the growth is impossible to say, but in view of the apparent effect in this case I would advise its trial in others.

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REPORTS OF CASES OF FOREIGN BODIES IN THE OESOPHAGUS AND BRONCHI OPERATED BY THE KILLIAN METHOD.

BY THOMAS HUBBARD, M.D.

Case I.—Boy aged four. One-cent piece in oesophagus one month. Complicated by stricture near cardiac orifice caused by swallowing lye when three years of age. (Referred by Dr. Krieger.)

This child was known to have a stricture of the gullet and yet was allowed to eat any kind of food and things. At intervals during the past month there had been complete obstruction, due no doubt to the one-cent piece, which was known to have been swallowed, but even during that period a rather large glass bead had passed through. The child was brought to me on account of inability to swallow food, and Mr. Dachtler, Roentgenologist, readily located the one-cent piece. Under ether anaesthesia the Killian tube was passed, and with the Brünings-Kirstein head-light the oesophagus was explored. At the depth of the tracheal bifurcation there was an infiltrated area of mucosa covered with granulations. Below this the tube entered a sacculated area filled with debris consisting of vegetable fibre, including peapods and sauerkraut and fragments of gristle and meat. I could not find the coin. I attempted to empty this sac by the forceps through the tube, but it was tedious and I withdrew the tube and used an old-fashioned bristle probang. This was very effective and I recommend it for this purpose. The sac was soon cleaned, but even then I could not find the coin. It was afterwards located in the lower bowel by the X-Ray. I had crowded it through the stricture and cardiac orifice during the excavating process.

A stricture of this kind should be treated, and I have no doubt that by careful dieting for a few years with occasional dilation of the cardiac orifice and local applications to the mucosa through the oesophagoscope he could be cured.

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Eight other coin and button cases have been successfully operated in part with the Killian instruments. The large Ingalls tube, non-bevelled, should be selected for this kind of exploration, as with it one is less liable to slip past a thin, flat foreign body lodged in the recess below the cricoid. Coins, and especially small ones, are not always easy to find, as they frequently shift when the patient is in anaesthesia, and may be anywhere from cricoid to cardia and flat against the wall in a bend or recess of the oesophagus.

I will report only two of the cases of *Bone Fragments in the Oesophagus* that have come under my observation. These cases are often of very grave character. Rapid ulceration and perforation of the oesophagus follow impaction of pieces of bone and crude surgical attempts at dislodgement. One never knows the dimensions nor the exact shape of the fragment, and usually the impaction is caused by sharp spicules on opposite sides. An experienced Roentgenologist can usually locate a large mass, but of course no detail as to exact shape can be expected, especially in adults. I would also add that, owing to the familiarity with this kind of foreign body, the victim is usually careless in seeking surgical advice. Often they do so only when compelled to by pain and cervical swelling indicative that the tissues are infiltrated and softened to the degree that makes examination difficult and extraction fraught with danger. The operator must depend almost entirely on the oesophagoscope and study the bone *in situ* and try to grasp it so that a partial turning will release it with the least amount of laceration of the mucosa. For this purpose a hook may be more useful than forceps.

Case II.—Woman aged forty-five years. Bone in oesophagus five days. (Referred by Dr. Kimball.)

During the past two days she could swallow only a small amount of liquid. The cervical tissues were oedematous and temperature was 102. The neck was rigid and there were all evidences of peri-oesophageal infection. She was quite hysterical with fear, but under local anaesthesia I succeeded in locating the fragment just below the cricoid isthmus. It was shaped like an anvil, both ends being sharp spicules. I grasped it fortunately and dislodged it, but there was considerable laceration. She was

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dieted on sterilized milk and given bismuth powders frequently and gradually the cellulitis subsided.

Case III.—Man aged seventy-six. Large fragment of bone in the oesophagus five days. Dimensions, 1⅜ in. x 1 in. x ¼ in. (Referred by Dr. Reed, Ottawa.)

Two attempts had been made to extract or push this piece of bone into the stomach. Fortunately it was too large to be pushed very far. Mr. Dachtler located it by transverse method, impacted just below the cricoid. The cervical tissues were oedematous and no food, not even liquids, had passed for twenty-four hours.

Under local anaesthesia the foreign body was readily seen about seven and one-half inches from the incisors, but it taxed the strength of the strongest forceps to dislodge it. The von Eicken claw forceps in the Bruenings extension shaft is a very remarkable instrument, combining lightness of construction, strength and an unyielding grip. Removal was accomplished by gradually revolving the piece on one fixed point of impaction. Recovery was uneventful.

Case IV.—Girl aged three years. Large, open safety pin in oesophagus three hours. (Referred by Dr. Hartman, Wauseon.)

The mother's attempts at extraction had undoubtedly crowded the pin well into the oesophagus and the natural efforts to swallow had worked the pin downward so that when the radiograph was taken the shield was about the level of the episternal notch and the point was exactly behind the sterno-clavicular articulation. At the time of the operation the pin was still lower; eight inches from incisors. On first thought removal by direct traction seemed like attempting to pull a large fishhook from a fish's gullet, but previous experience with two smaller open safety pins in infants gave me courage to attempt turning the pin. Careful measurements taken on the plate, and corroborated by a duplicate pin, showed that the point of the pin was 1¼ in. (3.2 cm) from the outer edge of the shield, and the shaft of the pin was 1 4-8 in. (3.5 cm) long. It was clear that the oesophagus was already stretched 1¼ in., and that to turn the pin on the fixed point would stretch the oesophagus only ¼ in. more.

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Under ether anaesthesia the pin was readily seen, and with a hook I made traction on the shield until the pin was turned and easily extracted, the point dragging against the lateral wall, of course. The pin point was slightly more distant from the shield than in the picture, but there was absolutely no appreciable traumatism.

As stated, I have used this method three times, but this is the largest pin that I have ever removed in this way. Safety pins are now made of steel as well as brass, and the operator should be sure of a larger margin of safety as shown by plate measurements before attempting to turn a steel pin. Once turned so that the spring coil loop is above the point, there is little danger of severe traumatism in extracting by hook traction on the shield unless the pin has caused a considerable degree of inflammatory softening. I have devised a snare for closing a safety pin, which is demonstrated with other instruments. The safety pin extractors of Jackson and Mosher seem thoroughly practical and should be used in neglected cases having inflammatory conditions.

Case IV.—Baby aged eight months. Brass Christmas tree candle holder in oesophagus six hours. (Referred by Dr. M. A. Jerome.)

A little sister put this brass thing into the infant's mouth. Like an open safety pin, it worked downward with every effort at deglutition. Unfortunately the mother nursed the baby just prior to the operation, so that I found it lower down than it appears in the radiograph taken by Mr. Dachtler two hours earlier. The parents led us astray as to the nature of the foreign body, as they thought it a triangular safety pin affair made of stiff brass. From the plate one could not determine the true nature nor which was the sharp prong. Through the oesophagoscope, the infant having been etherized, I could see only the brass rosette located about an inch below the cricoid, and grasped it with forceps and pulled. It was a relief to find that the two shafts were flexible. Extraction was accomplished by bending the brass prongs double and half turning, and as neither end was sharp there was no traumatism. In twelve hours the baby was in normal condition.

The testimony of parents and attendants is often very confus-

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ing. I have almost reached the conclusion that unless they can show a duplicate and are absolutely positive their testimony should be ignored. I have had them assure me that the foreign body was a peanut shell when it was an open safety pin; a wood splinter when it was a sharp piece of steel, and have been called to treat for croup when it was a shirtwaist button, etc., etc., and in fact, the lesson we all learn by experience is to try and take testimony only for what it is worth, and thus avoid unpleasant surprises.

Case VI.—Boy aged eight years. Brass ferrule, with rubber eraser in one end and steel pen in the other, in the left bronchus five days. (Referred by Dr. W. J. Gillette. Radiograph by Dr. L. M. Dolloway.)

When first seen this boy had a well developed broncho-pneumonia, temperature 103°, respiration 60, and constant coughing. No air entered the left lung. Under ether-chloroform anaesthesia Dr. Gillette opened the trachea, and with the Killian tube I could readily see and grasp the steel pen inserted in the proximal end of the ferrule. The sharp pen caught at the tracheal opening as I was about to extract and a sudden cough expelled the foreign body into the mouth. The pneumonia subsided in a few days and recovery was without further incident.

Case VII.—Boy aged 1½ years. Steel glass-headed pin in left lower lobe bronchus seven days. Measurements of pin: shaft, 1½ in. long; head, 3-16 in. diam. Radiograph. (Referred by Dr. O. S. Brigham.)

This infant was examined under anaesthesia immediately after the accident, and nothing was discovered by the surgeon. For six days the boy seemed fairly well, but occasionally he coughed and cried with pain. The family physician then took charge, and though there were no urgent symptoms, he exercised excellent judgment by taking him to Mr. Dachtler, who took two Roentgenographs. The plates were good, but it required most careful study to locate the pin as it was behind the shadow of the heart and low in the left lower lobe bronchus. Under ether anaesthesia, assisted by Dr. Peter Donnelly, I did a low tracheotomy. The small sized bevelled tubular spatula was introduced, *the long lip toward the left,* so that I could straighten out the angle of the

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left bronchus without danger of impacting the point of the pin. This is quite an important method in searching for a pin, as the non-bevelled tube passed far enough to straighten the bronchial angle is quite likely to crowd the pin point into the mucosa before the shaft is seen. By this method I brought the main bronchus into view and could actually pass the long lip down alongside the pin without touching it and thus get a perfect view of the shaft and locate the point. The head of the pin was engaged in the lower lobe bronchus and the point was concealed against the median wall of the main bronchus. Manipulations to release the point were thus made easy and the forceps blades grasping the shaft near the point were pressed over against the long lip of the tube to protect against catching the point during extraction. Recovery uneventful.

This case naturally brings up the question of selection of the *upper* or *lower method*—that is, *without* or *with* tracheotomy. In operations for extraction of such a foreign body as a sharp steel pin and those known to be from the nature of the body, size of the head, etc., location low down in a secondary bronchus; in fact, in all cases presenting unknown or unusual difficulties, I would say emphatically, *when in doubt do tracheotomy*. Bruenings, in "Zeitschrift fur Ohrenheilkunde," December, 1910, advises preliminary tracheotomy in children under two years as a general surgical rule. The advantages are: (1) a short tube and more chance for manipulations to release an impacted point. In case the body is like a pin the sharp proximal end nearly always lies impinging and more or less buried in the medial bronchial wall; (2) the use of the bevelled tube avoids the risk of impacting the pin point; (I have had some of my Ingalls tubes bevelled and fenestrated to allow respiration in both bronchi;) (3) the danger of losing the foreign body at the glottis or allowing it to drop back into either lung is lessened. (The latter accident may necessitate another radiograph to locate it, not to mention the danger of sudden asphyxiation.) I should add that in all of these cases in which tracheotomy is resorted to the trachea is freely incised and loops of silk passed through each lip of the incision to aid in drawing the trachea up to the skin surface, thereby making exploration by the tube much more easy. If it is desirable to keep the trachea open for a few days these retaining threads can be

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used to suture the tracheal edges to the skin, thus doing away with the cannula.

Case VIII.—Boy aged 1½ years. Screw-bolt in right lower lobe bronchus four days. Dimensions, ¾ in. long, 3-16 in. diam. (Referred by Dr. J. Ohlinger.)

The radiograph by Mr. Dachtler located the bolt in the bronchus of the lower lobe of the right lung, and as it had been there four days and the fever and coughing indicated considerable bronchitis, I decided at once to do tracheotomy. The Killian tubular spatula was used and a perfect view of the end of the screw-bolt was obtained. It was well down in the small bronchus, head downward, and filled it like a cork sunken into the neck of a bottle. None of my forceps blades could be made to enter alongside the foreign body. With cutting pliers I fashioned a small right angle hook with sharp feather edge and passed it alongside the bolt. The sharp hook when turned caught in the threads and a half hour of patient manipulation worked the bolt out until it could be grasped by the claw forceps and extracted. Recovery was without incident.

This case and others impressed on me the importance of hooks of various shapes in the armamentarium. Ingalls has particularly cautioned against using curved hooks, as they are liable to become entangled, but the short right angle hook is not dangerous. I now have a variety of hooks, and with cutting pliers at hand one can be adapted to the special indications, as in the above case.

Case IX.—Woman aged forty. Fragment of cement tooth filling in the lower lobe of the right lung seven months. Dimensions, ⅜ in. x 5-16 in. Triangular disc shaped. (Referred by Dr. Tuttle, of Van Wert.)

In February, 1910, Mrs. C. had submitted to extraction of twenty teeth under ether anaesthesia. On recovering she coughed violently, and for seven months she continued to cough. During all of that time she had not reclined in bed, nor had she had more than two consecutive hours of sleep. There was consequently decided emaciation, and at times fever, and she was thought to have consumption. The dentist and physician had accounted for all of the teeth extracted, but the patient persistently

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insisted that there was a foreign body in her lung. X-Ray examination by fluoroscope was reported negative by a local Roentgenologist. But she was not satisfied and came to Toledo. Mr. Dachtler located the small fragment in a lower lobe bronchus, right lung, at the level of the ninth rib posteriorly.

Operation.—Ether anaesthesia, ¼ gr. morphine, 1-200 atropine ½ hr. previous to operation. Assisted by Dr. Charles M. Moots, I performed low tracheotomy and made a careful search for the body. The right lower lobe bronchus opened into a cavity nearly an inch in diameter, the wall of which was covered with granulating areas, and filled with pus and bloody mucus. The depth of this cavity was about eight inches from the tracheal opening. The Killian aspirator worked perfectly, but even after a thorough cleaning out I could not see the foreign body. After an hour and a half search I desisted in attempts to locate it. Of course I was looking for a tooth, not knowing at the time that it was a shell-like fragment of cement. One week later Mr. Dachtler mapped out the thorax by leaden strips and also secured beautiful stereopticon plates by which we could get a good perspective and exact depth. The foreign body was at that time one inch to the right of, and the same distance anterior to the vertebral column, and at the level of the ninth rib posteriorly. Another trial was eagerly consented to, and as soon as I had pumped out the cavity the fragment of cement was readily seen and extracted. Recovery was uneventful, and a few months later she was reported to be in normal health.

Remarks—Mrs. C. had several crowned teeth, and this fragment was the filling under one of the crowns. The lesson one learns from this kind of case is to keep on trying. A small body in an abcess cavity is hard to find, and the patient should be warned to forestall disappointment that more than one trial may be necessary. I think now that at the first attempt it was imbedded in granulations and I probably released it. The cleaning out of the cavity was helpful in that at the second trial there was not so much pus and blood encountered.

I cannot speak too highly of the Killian aspirator. It is large enough to suck out thick or floculent masses with only the mod-

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erate suction force of the rubber bulb. I believe also that this method gives a decided advantage over the combination tube of Jackson, in that it is not necessary to pass the bronchoscopic tube down into accumulated secretions and perhaps impinge on the foreign body to accomplish the cleaning out of the cavity. With the Killian method the bronchoscope is passed only to the depth giving good vision of the bronchus or cavity to be explored, and the same holds good in oesophageal explorations. The aspirator tube is then passed deeper and gradually the pocket can be cleaned out. It seems like a rather awkward method, but it is very effectual.

Remarks on Local and General Anaesthesia—I use very little cocaine in adults and none in children in lower bronchoscopy. The method of drawing the trachea up to the skin surface by threads in either lip lessens the tracheal irritation very much, and I should add that the tube should be warmed and oiled, and with the patient properly etherized coughing is well controlled. Medium doses of morphine and atropine may be given, if indicated, to adults prior to bronchoscopy, but, as a rule, it seems to me a bad practice to subject a patient, and especially children, to the uncertain effects of a variety of narcotics and an anaesthetic. It confuses the essential symptoms on which the anaesthetist depends. Menthol vapor, 50%, lessens tracheal irritability. Profound anaesthesia, to the degree of abolishing all reflexes that interfere with vision and accurate instrumentation, is absolutely necessary, and the way to get it most safely is to depend entirely on a skilled anaesthetist. Dr. C. E. Price takes charge of that part of the operation, and invariably secures the proper degree of abolition of disturbing reflexes, and so far without even a suggestion of alarming symptoms. We have not as yet been forced to use oxygen on account of asphyxiation from inflammatory oedema or incident to anaesthesia or accidental obstructions, but as a precaution have it always at hand for emergencies.

I might add to these case reports a group of cases to the number of about a dozen having foreign bodies in the larynx, trachea of bronchi of the nature of kernels of corn, seeds, nut meats and fragments of shells of the same, peanuts, etc., but as they present

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no features bearing on the Killian method or instrumentation detail reports are of no special interest. Only one such case died without operative attempt, and that was a child who had aspirated fragments of peanuts during a paroxysm of whooping cough. Double pneumonia supervened and when first seen (four days after accident) she was *in extremis.* Autopsy revealed many fragments in both bronchi. Jackson has called attention to the mortality of peanut cases, and undoubtedly it is largely due to the fact that more than one fragment is aspirated.

Discussion on the Paper of Dr. Hubbard.

Dr. Chevalier Jackson: I think we have had in this paper and these radiographs a very clear demonstration of what I have urged, namely, that removal of a foreign body is something more than merely "doing a bronchoscopy." The removal of foreign bodies is a mechanical problem, and, as in several of Dr. Hubbard's cases, it requires consideration of the position of the foreign body, the shape, the material of which it is formed, and very often it entails the designing of an instrument to meet the mechanical problem presented by the particular case.

A number of cases have been reported by Casselberry, Mayer, Ingals, Richardson, Mosher, and others of our members, in which, no matter how large their armamentarium, they have found it necessary at the time of operation to construct a special instrument for the particular foreign body; so it comes down to the question of solving the mechanical problem. The foreign body is to be removed, and above all it must be removed without killing the patient. It is not a matter of the passage of the bronchoscope—anyone can learn to pass this instrument—but it requires a very good mechanic to cope with a difficult case of foreign body. There has been a great deal too much of a certain kind of work, which I am sorry to say, I think Dr. Hubbard has done much to increase, by seeming to sanction the seizing and violent removal of a foreign body like a safety-pin. It is relatively safe for Dr. Hubbard to do it, for he has a delicate touch and realizes how much he dare do, but it is my sad duty to be a silent witness, as consultant, of many deaths from just such work in the hands of those less skilful than Dr. Hubbard.

In Dr. Hubbard's case you will notice how high up the pin is located. With the point of the pin so high in the thoracic cavity there is less danger from pulling it out, but Dr. Hubbard must have done so by making traction on the lower end of it. If lo-

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cated lower, pulling it out would almost invariably kill the patient by esophageal trauma. Being in touch with so much of the work that is done, I find the mortality list is truly appalling.

Understand me, it is perfectly safe for Dr. Hubbard to go in and do anything he wants to do, because he has had experience and he works carefully, gently and scientifically, but anyone trying to follow him will undoubtedly kill many patients. The spread of the pin by its spring usually has its point already on the eye of perforation. The esophagus is already on the stretch and, if not already perforated, you are very apt by this manipulation to force it through. So great, in my mind, is the danger, that I now manipulate the pin down into the stomach under guidance of the eye and there turn it round and bring it into the tube spring-end first.

Dr. Hubbard's safety-pin closer appeals to me as a good one. Dr. Makuen has had a rare case; an open safety-pin in the trachea, and his closure and removal of it show his remarkable dexterity. There are many cases where the open pin was in the esophagus.

I hardly agree with Dr. Hubbard in regard to the indications for radiography. In probably half my cases the radiographer feels disinclined to take a radiograph, because the foreign body of which the patient gives a history is not dense to the ray, but one should be taken in every case, because the intruder present may be different from what is suspected, and lesions, such as abscess, as in one of my peanut kernel cases, may be found.

Again, I would disagree with Dr. Hubbard with regard to tracheotomy. The doing of a tracheotomy is unnecessary nine times out of ten of the cases in which it has been done. It is not done because of any lack of skill in bronchoscopy, but because of tradition. In the early days of poor illumination the light was so poor at the distal end of the tube that it made a great difference whether you used a long or a short tube; a short tube was very much easier, because the field was better illuminated. To-day with either a Brunings lamp or the little distal lamps, it is no easier endoscopically to take out a foreign body through a tracheotomy wound than through the mouth. It is impossible to tell by looking through the tube whether the tube is 20 or 40 centimeters long. I think we must limit tracheotomy to dyspnoeic cases, and the very dextrous will tracheotomize but few even of these.

There is another exceedingly important point lost sight of in the literature, and that is about the dyspnoea, dangerous and fatal, in a case of esophageally lodged foreign body than one of tracheally lodged foreign body. More patients have stopped breathing

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on the table in the esophageal cases. The slightest disturbance of a foreign body in the esophagus or a slightly misdirected esophagoscope, will compress the trachea, and if the patient is deeply anesthetized he will not start breathing again unless you introduce oxygen and amyl nitrite through a bronchoscope or a tracheotomy wound. Without either of these procedures, artificial respiration is useless. Such cases are usually attributed erroneously to "vagal reflex," which is rarely, if ever, seen, except in cases where commercial lighting circuits are "grounded" through the patient, and even here the real nature of the fatal ending is usually unrecognized.

Dr. Emil Mayer: I wish that Dr. Jackson in his discussion had gone one step further and spoken of the length of time that a foreign body may be permitted to lie within the trachea or bronchus without interference. Those of us who have been called upon to remove these bodies after they have been lodged for some time have often desisted in our attempts, because we have not been able to see the foreign body, and have not gone ahead because of the feeling that we were going through granulation tissue that was bloody and might lead we knew not where.

As has been said, the removal of foreign bodies with the bronchoscope is the theatrical portion of our work, at least it seems so to-day. But our ability to make diagnoses of the presence of new growths, of ulcerations, of conditions existing that we had not dreamed of before, is going to be the future and better work of bronchoscopist. I am quite sure, too, that all this is not going to be a terra incognita—it requires a little practice and every laryngologist will be able to use his bronchoscope then as well as his laryngoscope.

Dr. G. Hudson Makuen: I would like to ask Dr. Jackson if I understood him to say that the perforation of the esophagus by a pin in the removal of it might be a serious matter, and if perforation of the trachea in the removal of a pin by the point passing through the tracheal wall is also liable to be a serious matter.

In reference to my own case, to which Dr. Jackson has referred I met with an unexpected difficulty. After I had engaged the distal end of the safety pin in the ring, and closed it by pushing it through the ring, and attempted to bring the instruments and pin out together, the glottis grasped the end of the bronchoscope and held it so firmly that it was impossible to remove anything but the inner instruments. I first pulled out the pusher and then made traction on the ringed instrument, and to my delight, the pin came with it through the bronchoscope; but in coming out, the pin slipped off the ring and fell to the floor, so that I do not know in exactly what manner it was engaged in the ring. I have

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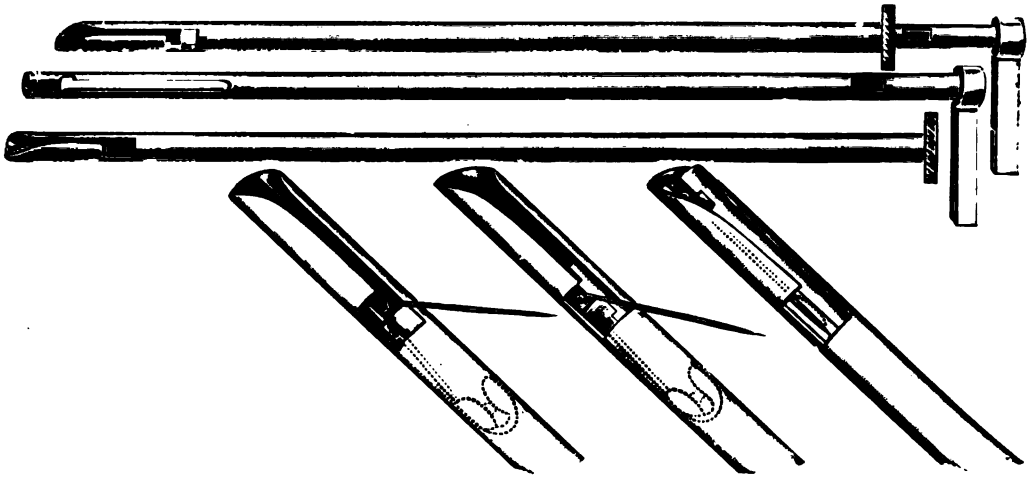
been wondering whether any particular damage might be done if, by some accident, the point of the pin had been made to penetrate the wall.

Dr. H. P. Mosher: Last year when Dr. Jackson reported his method of carrying an open safety pin into the stomach, turning the pin and then closing it by bringing it back into the esophagoscope, it seemed as though the last word had been said on this subject. A few months ago, in the case of a child two years old, I failed to get a huge safety pin by this procedure. The pin was lodged back of the arch of the aorta. The point was up and to the right, and about it there was a rent in the esophagus an inch long. In the manipulation everything that could go wrong



promptly did so. The pin was finally pushed into the stomach and removed by cutting. The result caused good natured remarks to be made at my expense by some of the members of the general staff. The boy died twenty-four hours after the pin was taken out. The findings before death indicated pneumonia. My failure in this case crystallized an idea for a safety pin closing tube which had been running in my head for some time. As yet the tube has not been tried on the living. Experimentally, however, it works well; that is, it will close and remove an open safety pin, point up, from various sizes of rubber tubing. Not only this, but it will remove the familiar glass headed pin and the ordinary brass one. The tube can be used not only in the esophagus, but also in the trachea and in the bronchi. Therefore, another word, such as it is, appears to have been added to the discussion of methods of removing safety pins.

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The safety pin tube is essentially a double esophagoscope. It consists of an outer tube which catches the pin and an inner tube which locks the pin in the outer tube, houses the point, and closes and extracts the pin. The tube will do the same by a straight pin, except that the withdrawal of the inner tube does not bring the pin with it. In order to get the straight pin out both tubes have to be removed together.

The safety pin tube can be lighted either by the method of Jackson or by that of Bruning. In the tube illustrated in the cuts the light is obtained by Bruning's lamp. The detailed description of the tube is as follows: The safety pin tube is a tube within a tube. The lower end of the outer tube is cut away on a long slant, and on the side there is a slit which runs up some two inches. The beginning or the mouth of the slit is made in the form of a wide V. At the upper limit of the slit there is a quadrilatoral opening which offsets the slit. The inner tube, like the outer one, has a slit on the side which also runs upward two inches. The slit in the second tube begins square and is so made that it allows a T-shaped tongue to fit in it and play it. The upper end of the tongue is fixed to the shaft of the inner tube, while the rest of the tongue is movable. In order to adjust the tubes for use, the inner tube is placed in the outer one and carried down so that the slits in the two correspond and so that the lower end of the inner tube comes to lie slightly below the quadrilateral opening in the outer tube. When the tubes are thus placed the head of the tongue of the inner tube does not quite close the quadrilateral opening of the outer tube, but leaves a sufficient space for the shaft of the safety pin. When one tube lies in the other in this manner, if the outer tube, the slit of the tubes being, for example, on the right, is rotated on the inner tube and rotated to the right, the riding by of the two tubes causes the quadrilateral opening in the outer tube to become closed. Up to this point the outer tube corresponds to an open ring, now it has been turned into a closed ring.

The working of the tube can be made clearer by leaving the description of the empty tube and describing from now on the tube with the safety pin in it. When a safety pin is caught in the esophagus, open and point up, the point of the pin is embedded in the tissues and it is hard to find. The other half of the pin, the part which bears the cap which receives and holds the point when the pin is closed, lies free in the esophagus and is comparitively easy to discover and to grasp. Imagine a case, if you please, in wihch the X-ray plate shows that the point of the pin lies on the patient's right. The two parts of the safety pin tube

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are adjusted after the manner which has just been described, and are locked together by a ratchet placed for that purpose near the beginning of the outer tube. The tube is introduced into the esophagus with the slit on the right and is carried down until the cap of the free half of the pin is discovered. Then the cap is grasped with locking alligator forceps and steadied while the tube is pushed further down. As the tube advances the half attached to the cap comes into the tube. while the other half which bears the point is embraced by the slit. Finally, the bend of the pin where the spring is brings up at the top of the slit. The safety pin is now to be locked in the main tube. This is accomplished by loosening the ratchet which holds the two tubes together and by rotating the outer tube to the right over the inner tube until the outer tube brings up against the shaft of the right half of the pin. When the outer tube has been rotated to the right as far as it will go it is held strongly in this position and both tubes are pushed a little in order to free the point of the pin from the tissues. This done, the outer tube is held motionless while the inner one is rotated a quarter of an inch to the left. This houses the point of the pin in the lumen of the outer tube. The final manipulation is to push the inner tube down as far as it will go and then withdraw it. As it comes out it brings the safety pin. This description sounds a bit complicated, but in reality the manipulations are simple, and become, when they have been practiced a few times, almost automatic.

Dr. W. K. Simpson: I would like to ask whether either Dr. Hubbard or Dr. Jackson has had any experience with esophageal impaction, especially with safety pins, by the article changing its position a number of times. I had a case of an infant where the X-ray showed the safety pin in exactly the same position as one shown by Dr. Hubbard, and the next morning the X-ray showed the exact reversal of the pin's position, so that it was then possible to abstract it without any trouble.

Dr. Henry L. Swain: We must consider the fact that we not only wish to remove the foreign body, but that we would like to have our patients get well, and as Dr. Jackson has said, in the removal of a foreign body from the esophagus the patient will sometimes pass away unless we do the right thing immediately. There have been many cases in which the patients have died after removal of the foreign body from the lungs. I had a case this Winter which gave me the idea of always watching the patient for a few days after the removal of a foreign body. The meat of a peanut was swallowed the wrong way, lodged in the right bronchus, having remained there for two weeks. Ten days before the patient had an acute febrile attack with a temperature of 104°. It

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was with comparative ease I discovered the meat of the peanut, and by means of a hook was able to get it into the trachea and then out. The next day when I went to the hospital I found the child sitting up in bed with just a thin cotton nightdress on. I asked the nurse if the child had any fever, and was told no. I asked to see the chart and found the little patient had a temperature of 96.5°; I asked how the temperature had just been obtained and was told by rectum. I have not a doubt that if I had not accidentally discovered the condition of this patient at this point the child would have passed away by morning. I think it was in a most precarious condition. We, of course, at once applied hot bottles, etc., and the child was pulled through.

One point of interest in this case was that the meat of the peanut having swollen somewhat and being impacted at an angle practically obstructed the whole of the right bronchus of this small child, and I was not aware of the purulent bronchitis until I removed the peanut from the bronchus, when it was followed by a perfect stream of pus; the next day both sides were full of the coarsest kind of rales, but these cleared in forty-eight hours.

Dr. Chevalier Jackson: I quite agree with Dr. Mayer with regard to the tremendous field opened up from the view we have gotten of lesions while going in after foreign bodies.

Dr. Swain touched on one of the most interesting and most mysterious subjects in bronchoscopy, and that is the fatal nature of the peanut. Of all foreign bodies I have had in the air passages, I have found it causes the most fatal results. The most plausible theory, of course, is that, because of its brittle nature, it breaks up and the multiple lesions caused by its fragments are often the cause of death. Yet, while this may account for some cases, I feel it is not sufficient for all. I have had three peanut kernel cases. In the first case, seen with Dr. Frank McCready, the peanut had only been in twenty-four hours, and in all my experience I have never seen that same degree of inflammation in the interior of the bronchial tract. There had been no previous bronchitis, no ordinary "cold," nothing whatever, yet I pumped out of both bronchi an immense amount of pinkish mucopurulent secretion, caused by a very intense degree of inflammation. The patient recovered. The second patient was sent to me by Dr. Wales, of Indianapolis. This infant, something less than one year old, had aspirated a peanut three months before; it had been treated for pneumonia, and the possibility of the presence of a peanut was discussed. The temperature had rised to 106 and had fluctuated between that and normal for many weeks. An abscess was located radiographically low down in the left lung. I evacuated the abscess bronchoscopically after re-

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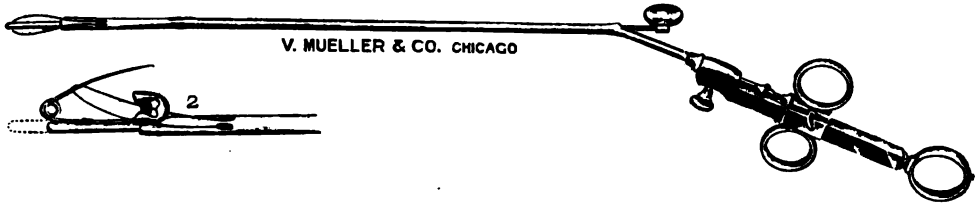
moval of the peanut kernel, and pumped out the pus, but the temperature kept on fluctuating between 105 and 106 every day and back to normal at night. A second radiograph by Dr. George C. Johnston showed a complete disappearance of the abscess, but revealed a pneumonia all over the upper part of the same lung. The child sweated profusely and died of pneumonia at the end of six weeks after the evacuation of the abscess. The third case was one sent from Erie by Dr. Schlindwein. The same conditions were present—a very high temperature, a very sick child, intense bronchitis. I removed the peanut, and against my wishes the child was taken home. It seemed perfectly well, but died at the end of three months after the accident.

I have, therefore, come to regard the peanut as the most fatal of all foreign bodies in the trachea and bronchi. Multiple fragments would not account for the intense generalized inflammation caused.

In regard to Dr. Mosher's ingenious pin closer, I think it is a well-planned instrument, and upholds me in my idea that in this work ingenuity is very essential.



Safety Pin Extractor. Dr. Thos. Hubbard, Toledo, O.

In reply to Dr. Makuen's question I would say the seriousness of a perforation by the point of the pin would depend altogether upon the position of the pin. In one situated very high there would be but little danger, but if situated more deeply the results from perforation of the esophagus would be almost invariably disastrous. I have seen quite a number of fatal cases with emphysema from perforation of the point of a pin. I have had no experience with traumatic perforations of the trachea by foreign bodies, but have seen two cases in consultation, both of which were fatal. I have seen quite a number of cases in which perforations from ulceration followed from the presence of a foreign body, and these being slower are less serious and are usually curable cases.

Dr. Thomas Hubbard: I would like to demonstrate a model of a safety pin closer and extractor. The principle is that of a snare. The cannulae are constructed of different lengths (12 inches and 16 inches), with the wire loop formed about ¾ inch

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from the end of the snare. The use of stiff nickel-plated steel wire (No. 5) for the loop is advised. Pass the small stylette through the cannula to hold the loop in a direct line with the shaft to facilitate introduction. When it is below the safety pin release the wire by withdrawing stylette and it springs out at 45 degrees angle to the tube. In drawing the instrument upward the loop can scarcely fail to encircle the open pin. With steady traction on the pin the wires are pulled home and as the safety-pin closes it lies parallel to the shaft and is readily extracted. Another advantage of this method, which is also important, is that you can let go of the pin or other foreign body in the loop.

Among the fatalities I have seen one was a peanut case. I did an autopsy and found many fragments of the peanut in both lungs. The fact that the child is eating peanuts is suggestive that the aspirated fragments may be many and hence the high mortality in this particular class of cases. If it were a kernel of corn, for instance, it would not be likely to be in fragments.

In reference to the safety pin proposition I maintain that as a rule a brass safety pin recently in the esophagus can be removed by direct hook traction on the shield with safety and precision. The cautions and exceptions are important. In case it is a sharp steel pin, and also in all cases in which the pin has been in the esophagus long enough to have caused inflammatory softening, turning will be dangerous. The method of Jackson—pushing the foreign body into the stomach and there turning or one of the various methods of closing the pin would, I think, be the better under these conditions.

In his latest article on Foreign Bodies in the Bronchi, Brunings advises tracheotomy in children below two years of age. I would say, when in doubt, do a tracheotomy—that is, lower in preference to upper bronchoscopy.

With reference to the lucky turn of affairs in Dr. Simpson's case, it shows that even though the pin is pretty well embedded, muscular action can change it. In two of my cases the pins moved downward between the time that the radiograph was taken and the time of the operation.

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THREE UNUSUAL BRONCHOSCOPIC CASES—(*A*) TUMOR IN THE BRONCHUS—(*B*) TRACHEAL STENOSIS—(*C*) TRACHEAL SCLEROMA.

BY EMIL MAYER, M.D.

Case A—Margaret I. W., age three years, referred to the writer September 16th, 1910, by Dr. Linn Emerson. The child presented the following history: At the age of eleven days it had a sudden attack of obstruction to its breathing, which yielded to treatment after a short time, and the child was entirely well until January of the present year. At this time she had an attack of grippe, followed by a spasmodic cough, the latter remaining ever since. On July 4th an attack of measles, and on the 25th her breathing became so interfered with that emphysema of the neck and body appeared, lasting several days. At the present time she breathes with a loud expiratory effort day and night. She has chronic constipation, prolapsis ani and a capricious appetite.

Examination—Child is well nourished; has good color. Peculiar loud respiration, showing interference with expiratory act. The respirations are so loud as to be heard quite a distance and remain of this character day and night, becoming somewhat worse on crying or exertion. There is no rise of temperature and the child plays about, getting readily tired, however, While she is never cyanosed, her distress in breathing often culminates in an attack of vomiting, but there is no relief to the breathing following the attack of vomiting. The examination of the chest shows a sudden distension of the entire chest wall at each expiratory effort, except for the lower portion of the left lung. In this part there is dulness on percussion and entire absence of air entering the lung in the left lower lobe. There is no bronchial catarrh. The diagnosis of some form of stenosis of the bronchus at the bifurcation on the left side was made. An X-ray picture, taken by Dr. Jaches, radiographist of Mt. Sinai Hospital, showed an absence of air entering the lower lobe of

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the left lung. There was no evidence of any foreign body shown in the X-ray picture.

At Mt. Sinai Hospital, under gas and ether, bronchoscopy was done on September 30th, the instrument used being the Killian hand light with a short tube. The child took the anesthesia very badly and was very much cyanosed. The holding of the epiglottis increased the cyanosis to so marked a degree that it was rapidly withdrawn. In the meantime, Dr. Yankauer, who assisted me, had a long tube attached to another Killian hand light, to which he had an attachment for the throwing of ether vapor into the tube during the entire examination, and at my request he introduced the longer tube rapidly into the bronchus. At the bifurcation directly over the entrance to the left lung a new growth was seen, having the general appearances of papillomata; there seemed to be several of them, with small pedicles, and amounting in all to a diameter of one-half inch. These were promptly removed, and after their removal the breathing became very much freer and air again entered at the lower portion of the left lung. The growth was referred to Dr. F. S. Mandlebaum, Pathologist of Mt. Sinai Hospital, who reported that, owing to the growth having been placed in formalin, it was impossible to test for tubercle bacilli, but that the growth had all the appearances of lues. The child recovered from the effects of the anesthesia, air freely entering into the formerly obstructed lung, and on the third day was sent to its home.

The examination of the child five months later showed no evidence of interference with respiration, the cough having gradually ceased, and the child was apparently well. In the meantime the child had been examined by Dr. Sara Welt Kakels, whose report follows: "Well developed child for her age; weight, 26¾ pounds; temperature normal. On the skin and visible mucosae nothing abnormal. Of the superficial lymphatic glands, the anterior cervical and inguinal glands are slightly enlarged. The inspection of the buccal cavity shows a slight hypertrophy of the tonsils; voice and respiration are perfectly normal. Inspection of the thorax shows that the chest walls move freely during respiration, apparently symmetrically on both sides; percussion over both lungs is clear and resonant; lower

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borders of both lungs normal. On auscultation there is vesicular breathing, on and off harsh over all the lobes of the lungs, to be heard; heart normal on percussion and auscultation. Thymus dulness present. Of the organs of the abdomen, the spleen is not palpable; the liver is very slightly enlarged, its lower border is one finger's breadth below the costal arch in the nipple line, while in the median line it is slightly above a point midway between the umbilicus and the xyphoid process. The urine shows no trace of albumin or sugar. The faeces show microscopically no pathological constituents. The blood count is as follows: Hemoglobin, 70%; red blood cells, 3,600,000; white blood cells, 10,200; differential count, polynuclears, 59%; small mononuclears, 30%; large mononuclears, 8%; eosinophiles, 3%. Wasserman's test was negative."

A most careful investigation into the family history as well as of the child shows no evidence of specific disease, and a résumé of the case shows that the clinical diagnosis of a stenosis of the bronchus at the entrance of the left lower lobe of the lung was fully established, this, together with the happy result following the removal of the growth, form a complication that is exceedingly rare.

Case B—Rose L., age twelve years, an inmate of an orphan asylum, whose past history is necessarily indefinite, was referred to the writer on December 12th, 1910, with the following history: An attack of diphtheria six years ago, followed by protracted cough. As far as known, she had been entirely well until four weeks ago, when she began with a cough, constant, spasmodic and without secretion. There was a short, sharp, ringing cough, with intervals of a few seconds, sounding more like the bark of a dog than a cough, rasping and very noisy. While not so frequent at night, still it occurred then. All manner of treatment had failed to relieve it. There was no dyspnoea, voice was clear, and there were no rales in the chest. It is almost impossible to express the extreme annoyance to the child, as also to its surroundings, occasioned by this noisy cough.

Examination showed the child to have hypertrophied tonsils and an adenoid growth, but these were not considered as factors in causing cough. Below the cords, high up in the trachea, there

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was seen to be a tracheal thickening, which showed itself not only in the laryngeal mirror, but also by direct examination. The bronchoscopic tube was then introduced, and on its introduction it was felt to pass through the firm constriction, and the diagnosis of spasmodic cough, due to a tracheal stenosis, probably post-diphtheritic, was made. The report of the findings was made the following day to the attending physician, Dr. Gershel, who reported that immediately following the bronchoscopy all cough had ceased, and this condition of cure of most distressing cough has remained permanent from the single dilation following the entrance of the bronchoscopic tube. The general appearance of the trachea at the time of examination clinically resembled those cases of tracheal scleroma that the writer has seen, and that diagnosis would have been made were it not for the fact that the child was born in the United States, and no case of this affection originating de novo in this country has ever been presented. The examination with the bronchoscope was readily made under local anesthesia.

Case C—Rachel R., age eighteen years, six years in the United States, native of Russian Poland, was admitted to the surgical wards of Mt. Sinai Hospital, service of Dr. Howard Lilienthal, two and a half years ago, suffering from dyspnoea, requiring tracheotomy. Before operating Dr. Lilienthal requested me to see the case to determine the nature of the stenosis.

I found a tracheal thickening with much induration on the line of the cricoid cartilage, and much crust formation in the nose with hyperplasia, and made the clinical diagnosis of rhino-tracheal scleroma. A portion of the thickened tissue from the nose was removed and sent to the Pathological Department for examination. The report came back from Dr. F. S. Mandlebaum, Chief of that Department, that it was negative. A second portion was removed a few days later, and this time it was reported to be a rhino-scleroma. Operation was not advised and the patient was then kindly referred by Dr. Lilienthal to the out-patient department of the Mt. Sinai Hospital Dispensary under the care of the writer. The dyspnoea subsided, the voice was

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husky and the nasal secretions kept up their crust formations until a year ago, when she began to again show symptoms of tracheal obstruction. From this time on dilatation by means of the Killian tubes was practiced every week regularly, with the result that the breathing became normal. Of late the dilatation has been done less frequently, about once a fortnight, and the patient is in a very comfortable condition. The bronchoscopic tube in this case enters very readily; the patient has become tolerant, and she has been exhibited at various medical societies, usually permitting the introduction of the bronchoscopic tube in about thirty seconds' time. During the absence of the writer from the city the same treatment was followed by Dr. Yankauer. This case is of special interest in that most cases of tracheal scleroma have heretofore required tracheotomy, with the more or less constant wearing of the canula. This method is surely but palliative.

In presenting these three unusual cases, the writer concludes that the correctness of the clinical diagnosis was fully established in the first case, with the happy result of complete recovery followed the removal of the growth, which failed to show any symptoms of lues, and in the absence of all tests must be put down as a benign growth, again illustrating the value of the bronchoscope as a means of diagnosis and an assistance in the surgical treatment of these cases.

In the second and third cases the bronchoscope was first used as a means of diagnosis and also as a remedial agent, producing cure by rapid dilation in one case and giving decided relief in the other.

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A CASE OF MULTIPLE FOREIGN BODIES IN THE SMALLER BRONCHI.

BY F. E. HOPKINS, M.D.

Bronchoscopy is sufficiently recent and individual cases vary so greatly in the range and difficulty of the problem presented as to warrant the recording of each case. The following case was inevitably fatal and falls into the class of the interesting rather than instructive.

E. U., a girl four years old, with a history of having inspired a peanut, was courteously referred to me by Dr. W. G. Craig, of Springfield, on June 5th, 1910. On the chance that the foreign body might be of a character to be located by the X-ray, Dr. Van Allen made an examination, although he stated that if it were a nut no shadow would appear, and the plate proved to be negative.

Bronchoscopy showed no foreign body in the trachea or in either right or left bronchus. This outcome was highly disconcerting. The history was clear—the child in the presence of both parents was eating peanuts when it coughed, and on the deep inspiration following was thrown into great distress, breathing with much difficulty and coughing violently. The cough ceased after about half an hour, but there was no relief to the labored breathing. The hospital records, made when the patient was received, mention marked retraction of chest walls on inspiration—wheezing and whistling rales over both lungs—small area of dullness above right nipple. Temperature normal and pulse 100. The bronchoscopy proving negative, I was at the limit of my resources nor could other members of the hospital staff give aid.

After two days, the patient's condition being yet more desperate, bronchoscopy was repeated, Dr. Dudley Carleton, surgeon on service, being present to do a tracheotomy, that a shorter, wider tube might be used if this seemed advisable. As in the

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first instance, examination of trachea and right and left bronchi was quickly and easily made and tracheotomy was not done.

The child died an hour later and an autopsy showed many small fragments of the nuts scattered throughout the lungs and around each fragment a congested and hemorrhage area. Twenty-four of these fragments with their pneumonic areas were counted. Instead of a single nut occulating the trachea or larger bronchi, the many fragments of the well chewed nut were shot into a smaller bronchi.

For the notes on this unusual case I am indebted to Dr. H. A. Schneider, House Surgeon of the Springfield Hospital.

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A CASE OF SPINDLE-CELL SARCOMA OF THE LARYNX.

BY J. PRICE-BROWN, M.D.

On February 17th, 1911, Mr. E. O., aged twenty-three years, lithographer, tall, anemic and thin, was referred to me by Dr. A. D. Watson, of Toronto. He had been suffering from sore throat, low down on left side, with gradually increasing stenosis, for two months. He claims that previous to the time mentioned he was quite well. The only medicine he had taken was a tonic. There had been no direct treatment of the throat. Swallowing was very difficult and painful. Fluids went down easier than solids. Night cough; slept poorly; pains in throat at night and day, particularly in left side; no report of fever, but sense of chilliness at night time; respiration difficult, but better through nose than mouth; bowels regular. At 9 p. m. pulse 94, resp. 17, temp. 99 3-5. Worked up to previous day.

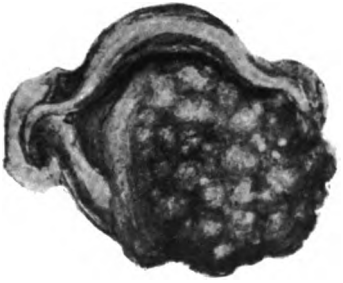

Fig. 1.
Tumor as seen on first examination.

Examination.—Nose, nasopharynx and oropharynx all normal. A very large tumor filled the larynx. It was dark red and corrugated on left side, a little bluer and smooth at right border line. It somewhat resembled a huge dark colored strawberry, particularly on left side, with very wide sessile base. It was immovably fixed by wide attachment to left arytenoid and left ventricle region. It so filled the larynx that only a narrow slit between it and the epiglottis was visible on the right side; while on the left it completely overlapped the larynx, hiding part of the epiglottis and the whole of both arytenoids and commissure.

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The basic attachment appeared to be as wide as the surface on the left side, projecting over into the oesophageal region; yet it was evidently situated above the vocal cords, as the man retained a strong, guttural, muffled voice. Externally the adjacent glands on the left side were enlarged and tender on pressure.

Owing to the roundness, smoothness and color of the right edge of the tumor, my first impression was that it might be a cystic angioma—although possibly an angio-sarcoma.

The question was how to deal with it. If nothing were done, and the tumor continued to grow, as it had done during the past few weeks, suffocation would very quickly ensue. It did not look like an operable case, that is, by direct excision, owing to the large amount of glandular tissue involved and the rapidity with which it was growing.

Diagnosis, too, should be made quickly. For this to be accurate, a large segment of the most solid part of the tumor would be required. The whole upper surface of the tumor seemed to be too flat and widely attached to allow a suitable piece to be at once removed by snare. I also feared, if my idea of angioma were correct, that an attempt at snaring might produce dangerous hemorrhage.

I therefore made, under cocaine and adrenalin, a preliminary incision with the elctro-cautery knife, into what seemed to be the most solid part of the tumor. The bleeding was very profuse; but the tissue was hard and resisting, and my idea of angioma collapsed. I then concluded to cauterize the growth as much as I could at each sitting without producing dangerous bleeding, and as soon as possible isolate a large segment of the solid tumor, and then remove it by snare for microscopical examination. The operations were repeated daily at my office; but each time I noticed that other parts of the neoplasm, not touched by the cautery, were growing very rapidly, and it was not until the fifth day that I secured the desired segment. This was a piece of solid tissue as large as a medium-sized marble. It was put in a solution of formalin and sent to Dr. Archibald, a skilled pathologist, to examine. He pronounced it as a positive case of spindle-cell sarcoma.

As the patient bore the operations cheerfully and the growth

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of the tumor continued to be very rapid, I decided to use the cautery morning and evening, if the patient could stand it, in order to beat the growth in the race, taking care never to touch normal tissue with the white-hot cautery blade. The patient was ordered not on any account to attempt to swallow solids of any kind until instructed to do so, but to drink very freely of milk.

From day to day, before using the cautery again, the sloughs produced by the previous burning were removed by either forceps or snare, and here they are. These were taken away during the first three weeks of treatment. They do not include the large segment sent to the pathologist. By this time the bulk of the growth had been removed and a bit of the right cord could be

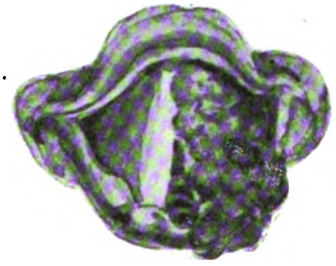

Fig. 2.
Showing regrowth during application of radium.

seen. The tumor was not more than a fourth of its original size, and I considered that it would be a good time now to try the effect of radium.

For this I consulted my friend, Dr. Ryerson, who had secured a good supply of the metal from Germany. He kindly rendered his assistance. The amount he used was 22 milligrammes; 12 milligrammes were attached to a laryngeal applicator and placed within the larynx upon the growth, and held there by the patient for from twelve to twenty minutes without removal. At the same time ten milligrammes were strapped to the neck over the enlarged glands and retained in position for an hour. This continued treatment was repeated on alternate days for more than a week, the electro-cautery operations for the time being suspended.

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During this period there was less pain. The increase in growth, however, was enormous. The larynx was filled again, but the color was lighter, and the new part of the tumor more polypoid in shape. Externally the glands had enlarged. It is possible that the radium was modifying the character of the growth, but the position was too vital to allow the treatment to be continued.

At this time I exhibited the patient to the section of ophthalmology and oto-laryngology of the Toronto Academy of Medicine, and asked the opinion of the Fellows upon the wisdom of attempting a radical operation. It was not advocated by any one, and an ex-chairman stated that he would not consider it a case for operation in that way.

About this time the patient had some severe nocturnal suffocative attacks, the family physician being summoned under the belief that he was dying.

As he survived until morning, he was again brought to my office, and I resumed the daily cauterizations, and I continued them almost without interruption until the next meeting of the academy, when I again exhibited the patient.

During this period, that is, from the time of the cessation of the use of radium up to that date, this bottle of fragments had been removed. The right vocal cord could be readily seen for its entire length, and the tumor was smaller than ever. The enlargement of the glands, too, at the side of the neck had almost disappeared. The Fellows of the Section commented on the improved condition.

At this time the patient was exceedingly thin, and while over six feet in height weighed only 124 pounds. He was still on the milk diet. From then until now the burnings have been repeated on alternate days, the hemorrhage gradually becoming less. As the sloughs were smaller they were not saved. The left ventricular band, being embodied in the growth, has disappeared, but the left vocal cord, although thickened, can now be seen from end to end. It retains with its fellow the full power of abduction and adduction.

The operative treatment now is to keep under control the vegetations as they arise, with the hope of ultimately getting rid of

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the entire base. At the present time the larynx is clear and open. The man is in good voice. The glandular enlargement and the soreness of the neck are gone. Over a month ago the restriction to milk diet was removed, giving him the option of any food he liked, on condition that he masticated it well and ate slowly, but advising eggs and pudding-diet for a while. Now he goes to the table with the rest of the family and takes a square meal. Since last showing him to the academy his weight has increased from 124 to 140 pounds.

Fig. 3.
Showing reduced size and marked inactivity of growth.

Remarks.—One great disadvantage in treating this case has been the length of the patient's neck and the great distance down to the vocal cords. But there has been a corresponding advantage which has more than made up for the depth of the larynx; that is, the form and position of the epiglottis. It is the arc of a large wide circle, the lip leaning all the way round forward toward the base of the tongue. Another advantage I have had is the bright, cheery, optimistic tone of the patient. He always came in and went away with a bright smile. And although up to the present time I have cauterized the larynx at fifty-one sittings, and never, since the piece was snared off for pathological examination, with less than five cuts, with the cautery knife, yet his entire confidence has been retained throughout.

Another point I think is worthy of note: Throughout this prolonged cautery treatment there has never been any injury done to the laryngo-oesophageal wall. At no time, whether in taking fluid or solid nourishment, has there been any complaint of particles or drops falling into the wrong passage. The larynx

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has retained its normal contour, and there is no appearance anywhere of cicatricial contraction producing deformity arising from the operations.

NOTE.—*September 1. The tumor continues to develop, but much more slowly. The most recent interval between cauterizations was seventeen days. But the patient feels well, takes his meals heartily, and, while keeping up in weight, has, for three months now, worked steadily in full time at his occupation of lithographer.*

Discussion on the Paper of Dr. J. Price-Brown.

Dr. John N. Mackenzie: Just a word relative to the use of radium. Its advantage over the X-rays is that it can be used in cavities that are not directly accessible to the Roentgen light. In the mouth, the lips, the sides of the gums, the tongue, the inside of the buccal cavity, radium can be used with great accuracy, because the observer can sit down and have the process under his eye every second of the time. If, however, we put radium in cavities more or less inaccessible we do not have the opportunity of watching its work carefully and we do not know what it is going to do. Gilchrist has had great success both in skin lesions and in processes in the cavities of the mouth, and he says that one application is sufficient, but he watches the radium every instant.

Last Fall I had the pleasure of a very interesting talk on this subject with Wickham, of Paris, who is the greatest living authority on the therapeutic uses of radium. He said that under no circumstances, so far as his experience went, would he consider the idea of using radium in the deep throat cavities, in the larynx or deep parts of the pharynx.

The X-rays are used with great success in the pharynx; I reported some cases some years ago in which extensive cancer of the pharynx healed, but broke out subsequently in the larynx.

Dr. J. Price-Brown (in closing): With regard to the use of radium I would say that I had the pleasure of hearing Dr. Wickham describe his methods in an address in Toronto, and I listened to hear what he would have to say regarding its use within the laryngeal cavity. He showed many admirable results in growths on the surface, but deeper laryngeal growths he did not mention.

I commenced using the cautery in this laryngeal case because of the success I had in nasopharyngeal cases.

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A CASE OF NASAL SARCOMA REMOVED BY INTRA-NASAL OPERATION—RECURRENCE IN THIRTEEN YEARS—EXTERNAL OPERATION AND NO RETURN AFTER THREE AND A HALF YEARS.

BY CHAS. H. KNIGHT, M.D.

The dividing line between benign and malignant disease is not sharply drawn. Certain neoplasms with a clinical history and histological features of malignancy remain stationary for years, or even undergo resorption, while others equally suspicious promptly recur after apparently radical extirpation. Hence there is no general agreement as to the interval that should elapse after operation before it is safe to pronounce a positive cure. Three years is accepted as a proper period by many. At least one authority (Felix Semon) believes that much less time (one year) is sufficient as to the larynx, of course on the assumption that the disease is strictly localized and has been completely eliminated. On the other hand Ruault declares that seven or eight years may pass without obvious change in volume or behavior of a malignant tumor. In my own experience the case to be described is without parallel—it was nearly thirteen years after the first operation that signs of recurrence appeared.

M. S. L., fifty-five, single, stenographer. The patient is a woman of nervous temperament who has always had good health, aside from a tendency to digestive trouble. In 1894 she began to have stenosis of the right nostril, together with severe frontal headache and attacks of epistaxis. The details of her history at this time are recorded in the N. Y. Medical Journal, August 15th, 1896, p. 222, by Dr. C. Melville Black, of Denver, through whose courtesy the case came under my care, and who did the primary operation, with apparent success. Having made the diagnosis, Dr. Black proceeded to remove a somewhat pedunculated tumor from the right middle turbinate region, under ether, with the cold wire snare. In

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this way a mass "an inch and a half long, three-quarters of an inch wide by an inch high" was removed. The base was scraped with a sharp curette. On two subsequent occasions, a week and ten days later, another almost equally large piece and several fragments were removed with the snare, under cocaine. Finally thorough cauterization of the granulating surface was done with trichloracetic acid. In the course of the following month the parts appeared perfectly healed, with no vestige of morbid growth. The diagnosis of "alveolar sarcoma" was confirmed by a microscopic examination made by Dr. H. C. Crouch, of the University of Colorado.

After recovery the patient came to New York and for several years I saw her at intervals, but never found cause for anxiety.

Twelve years later she had an attack of typhoid fever (October, 1906). She had frequent nosebleeds, and in July, 1907, saw Dr. Black, who at once recognized recurrence and advised immediate operation. She delayed coming to me until September. At that time the region of the right middle meatus was occupied by a soft, vascular mass, at one point adherent to the septum. Its surface was irregular and it was very sensitive to palpation, but painless. There had been no spontaneous pain, only a feeling of fullness and discomfort. Secretion, which was excessive, was rather offensive, was often streaked with blood, but there had been no free hemorrhage. The landmarks having been effaced, it was impossible to determine the implantation of the growth with accuracy, but a shadow in the antral region on transillumination, the wide attachment of the growth to the outer wall of the naris and the general history indicated invasion of the sinus cavity. For this reason no attempt was made at removal through the nostril, but several pieces were excised with Grünwald forceps and submitted to Dr. Jonathan Wright for microscopic examination. He reported: "This specimen shows many separate areas of proliferated connective tissue cells, apparently those lining the lymph spaces. It is undoubtedly an *alveolar endothelial sarcoma.*" Dr. Wright also examined sections of the original tumor, kindly sent me by Dr. Black, and expressed the opinion that it was of similar type, although the specimen had so degenerated with age that it was impossible to say from what cells of

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the stroma it sprang, "presumably, however, the endothelial cells of the lymph spaces."

In conformity with this report and my own view of the condition, Dr. Farquhar Curtis was asked to do an external operation at the Manhattan Eye, Ear and Throat Hospital. The affected parts were exposed by an incision from the inner canthus downward around the right ala, and a second extending from the former outward beneath the eye. It was found necessary to remove nearly all of the naso-antral wall and part of the floor of the orbit in order to surely include all the morbid deposit. Otherwise the operation was not remarkable. Recovery was rapid. A moderate keratitis occurred during convalescence which left vision somewhat hazy for several months. A feeling of weight and falling of the eyeball was complained of and sensation in the skin of the face and side of the nose was impaired. All these slight discomforts gradually disappeared, or the patient became accustomed to them. As to disfigurement, one sitting opposite the patient in a bright light can hardly detect the slightest scar. Up to the present time there has been no indication of return of the growth, and there has been marked improvement in general condition (3 years and 6 months).

It is perhaps quite natural for the specialist to resent encroachment on his field by the general surgeon and to describe his method of procedure as "mutilating." It is true that the spectacle presented, for example, by a patient in the midst of an operation for resection of the upper jaw is rather appalling to one accustomed to work in the dark, or in cavities artificially illuminated. On the other hand, we are all familiar with the wonderful reparative power and slight deforming effect of clean incised wounds of the face. Such being the case, and in view of the uncertainty as to the degree of malignancy in a given cancerous growth, it seems to me unwise to indiscriminately recommend intra-nasal operation unless we are able to show beyond question that the lesion is pedunculated or circumscribed.

In conclusion, the question suggests itself as to this particular case—was it one of genuine recurrence or a new development? If the former, we shall be compelled to amend our view as to the post-operative interval, after which we may safely assure permanent exemption.

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FOUR INTERESTING CASES OF FUNCTIONAL APHONIA.

BY RICHARD FROTHINGHAM, M.D.

In a most interesting paper on "Hysterical Mutism," read before this Association in 1906, Dr. G. Hudson-Makuen explains the mechanism of speech, goes into the subject of aphonia, and deals with hysteria in such an able manner that it would be useless for me to dwell on these topics before this Association. His summary and conclusions are so absolutely in accord with my own observations that it would be but a repetition for me to summarize or to quote from his article.

I have, therefore, confined myself to a simple recital of the cases. The four cases here reported were seen at the Vanderbilt Clinic, and each presents some interesting or peculiar feature.

Laryngoscopic examination showed the typical picture of functional aphonia in all these cases. There was present the so-called "paralysis of adduction." On phonation the patients could only whisper, but on coughing the cords would come together and a distinct cough could be heard.

Case 1—Female, aged 20 years, single, a telephone operator in one of the largest hotels. Family and previous history of no interest. Patient well developed and nourished, and by no means a nervous individual.

On presenting herself for treatment the patient could only whisper while in an upright position. When asked what was the matter, the patient replied in a whisper that "something was dislocated or out of place in her throat and that, whatever this thing was, it had dropped down into her throat and shut off the voice in such a way that she could only whisper." The present trouble had lasted for six days. Previous to this, at times, for several weeks, she felt as if there was a lump in her throat. This sensation became more and more frequent, lasted longer and longer, and finally the patient was constantly swallowing or

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clearing the throat to get rid of this lump. Eventually this sensation of a lump became constant. One day she felt the lump drop in her throat, and from that minute the patient could only whisper when in an upright position or when lying on her back. Immediately on feeling this sensation in her throat, the patient bent her body as far forward on her knees as possible, and, inverting the head, felt the "dislocated" part of the throat slide back into position and discovered that she could talk normally while in this position. As the patient assumed an upright position she again felt this "dislocation" and the voice was immediately lost. The patient again bent forward, the voice was restored, and again lost before she was half way erect. The patient could talk just as long as the head was held low down on the knees. I had the patient try this a number of times and the result was always the same; the voice being gone before the patient could become erect.

Examination of the larynx showed that the case was one of true functional aphonia. There was also hypertrophy of the lingual tonsils to such an extent that the tip of the epiglottis was embedded in this lymphoid tissue; otherwise the throat and nose were normal. After making a laryngoscopic examination, I directed the patient to lie down on the table. I then suggested that if she would throw her head as far back as possible over the end of the table, the "dislocated" portion of her throat would probably fall back into place, and that, upon resuming the upright posture, it would not again become "dislocated" as quickly as after throwing the head forward and downward. The patient tried this several time, and, to my surprise, was able to talk for a few minutes. Then she would start to say, "I feel my voice going," and the voice would be gone before the sentence was finished. The success of this experiment made me regret that I had not suggested to the patient that throwing the head backward would restore the "dislocated" part into permanent position. On the patient's second visit to the Clinic, a few days later, she would regain the voice and lose it in the same manner. This day I applied the faradic current directly to the cords. The voice was restored, and although the patient still felt the lump in her

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throat, the part did not again become "dislocated" and the voice was retained. A few days later I snared off several large masses from the base of the tongue, relieving the pressure on the epiglottis. After this operation the patient had a very sore throat, but the lump was missing and the voice was still retained. About a week later I snared off all the lymphoid tissue that could be engaged, and cauterized a few small masses with the galvano-cautery.

A slough from the cauterization became loose and was moved around in such a way that at times it would rest on the epiglottis. When the patient felt this sensation loss of voice followed. On bending forward and shaking the head the mass would be moved and the voice restored. I removed the slough with forceps, and from that day the patient never again lost her voice although she has been under observation for five years.

Case 2.—Female, single age 19 years, works in a factory. An unusually healthy and buxom girl. On coming to the Clinic she was unable to produce any sound except in a whisper. Family and previous history negative. The present trouble is as follows: Seven weeks ago the girl awoke from a sound sleep with a feeling of suffocation, and, discovering that her room and the entire apartment was filled with smoke, became frightened, tried to call out and sound an alarm, but could produce no sound. On rushing to the window for air, the girl could see an excited crowd on the street, and in a few minutes fire engines appeared. The fire, which was in an apartment lower down in the same house, was quickly extinguished; but from the time the girl awoke she could only whisper. She consulted several doctors, none of whom made a laryngoscopic examination, and was treated for "smoke laryngitis." After waiting over six weeks for the voice to improve the girl presented herself at the Vanderbilt Clinic.

On laryngoscopic examination no congestion of cords or larynx was seen, but a diagnosis of functional aphonia was made. Nose and throat unusually healthy. Faradic current applied to cords, and voice permanently restored.

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Nearly a year later the patient, while running up stairs, fell and bruised her leg and thigh quite badly. The pain was so severe that the girl felt nauseated and could not arise. She tried to call out for help, but could produce no sound. Later she was assisted to her own apartment, and although the injury to the leg proved to be nothing more serious than bruises and the patient was neither confined to her bed nor to the house, the voice did not return. Knowing that she could not see me at the Clinic until three days later, she did nothing for the voice.

The night before the patient was to see me a lighted lamp the girl was handling upset. She screamed out in sudden alarm. The lamp was righted before any damage was done, but the shock from this sudden fright restored her voice permanently. This patient reported to me for over four years, and there was no recurrence.

Case 3.—A schoolgirl, aged 14, 5 feet 7½ inches tall; a very slight, frail and extremely nervous girl. First seen at Vanderbilt Clinic May 6th, 1910. Father and mother nervous and excitable, but had never suffered from nor been treated for any nervous disease, and there is no evidence of nervousness in the other four children.

The child had scarlet fever when 3½ years old and malaria when 5 years old, but never seemed nervous before the present trouble commenced. Menstruation began at age of 13. The girl had suffered from toothache for several days, and twelve days previously had a tooth extracted. The girl was very much excited and upset after the removal of the tooth. That night she was very restless, and on awakening next morning was unable to talk. On coming to the Clinic she was very much upset, extremely nervous and hard to handle. Laryngoscopic examination showed a typical picture of functional aphonia, with very large lingual tonsils. When first seen she refused to have the tissue from the base of the tongue removed, and even now I cannot induce her to consent to any operative interference. The faradic current was applied to the cords and the voice restored. Two days later the girl was excited and upset by her brothers teasing her, and the

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voice was again lost and restored by faradic current. From May 8th until school closed the girl would lose her voice every few days, oftentimes from the most trivial cause. It seemed that the slightest excitement or emotion would be followed by loss of voice. She was so nervous that it often required considerable coaxing to induce her to permit me to apply the faradic current, and so much time was wasted that I resolved to find some simpler way of restoring the voice. At that time the external application of the faradic current was useless. It occurred to me to try the introduction of very hot laryngeal mirrors. I commenced with a hot number 3 mirror, then numbers 4 and 5, with negative results. The patient's throat was rather narrow, and the larger mirrors caused considerable gagging. Picking up a number 8 mirror, I showed it to the patient, comparing its size with the other mirrors, and told her that the great shock produced by it would surely bring back the voice. The stretching from the introduction of this large mirror caused severe contraction of the latero-pharyngeal muscles, coughing and gagging, with immediate restoration of the voice. From this time on the introduction of this large mirror would always bring back the voice, smaller mirrors always failing. Not content with this success, I commenced to try different methods. It was discovered that the introduction of a tongue depressor, or anything twisted in such way that it would stretch the lateral pharynx would restore the voice. It was also found that simple elevation of the epiglottis would restore the voice. The present method employed is to take an ordinary teaspoon, glide the handle down over the dorsum of the tongue, and on touching the epiglottis the voice is immediately restored. I have tried touching all other parts of the throat without stretching the lateral pharynx or touching the epiglottis, and the result is always negative. Last spring I assured the girl that the closing of the school, absolute rest from books and study, plenty of fresh air and sunshine would bring about a permanent cure. The child, however, remained in New York during the entire summer. The parents were unable to keep her from reading books or to make her stay out of doors. After the school closed the intervals between the loss of voice became longer and longer,

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and eventually she kept her voice for five weeks. Shortly before school opened she commenced losing it again, and has kept it up ever since. I wanted the girl to stop school in October, but could not induce her to do so. I did, however, succeed in getting her to give up her second term this year, as by this time she was losing her voice nearly every day. Since stopping school the girl has improved, but still loses her voice about every five days. Were I to enumerate the causes of loss of voice in this child it would fill a book. Any emotion, whether of joy or sorrow, results in loss of voice. The girl will be quietly reading a book and start to talk, only to find that the voice is gone. Evidently something emotional in the book so stirs her up that loss of voice follows. The most recent causes of loss of voice were: May 5th, joy on being told that she was to go to the country June 1st instead of July 1st, as she had expected. May 11th, hit on head by a putty bullet from a boy's toy gun. May 16th, from laughing at some story her sister told her about one of the teachers at her school. May 21st, the girl was interested in hearing the mother's account of a play she had seen; she started to make some comment in reference to the play, but the voice was gone.

In a mild sort of way all sorts of suggestion has been tried with this girl, but nothing seems to work. The neurologists consulted in regard to this patient do not care to resort to hypnotism as long as the voice can be brought back by such simple means. This year the child is to go to the country for three months, and I hope it will result in a permanent cure. For some reason the neurologists seem to think that in this case the loss of voice is due to some sexual shock or sexual abuse, and, as some such evil or sexual shock is supposed by many neurologists to be the cause of many cases of hysteria, I briefly report a case of such nature.

Case 4.—Female, 17 years old, nursery maid, living in the suburbs. Was first seen on April 13th, 1910. On coming to the Clinic she had been unable to speak for six weeks. Patient so nervous that even laryngoscopic examination was extremely difficult, but the picture of typical functional aphonia was revealed. No marked pathological condition of throat or

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nose. Attempts to apply faradic current to the cords were thwarted by the patient's seizing the instrument, turning the head and even rising from the chair. The patient was referred to Dr. William V. P. Garretson to see what he could accomplish by hypnotism, and from him I have obtained the following account of the case: "Family history negative. Menstruation since 14 years of age. She admits overwhelming sexual desires, but fears the consequences of contact. Six weeks ago, while returning from church at night, she allowed her escort to fondle her while lying on the grass in a secluded spot. Sudden advances with the genitals exposed alarmed her greatly. She attempted to scream, was choked by emotion and could not cry out. Returning home, she remained awake all night, overwhelmed by fear of having become pregnant by contact. Next morning voice was weak and hoarse; she thought she had caught cold, and was treated for laryngitis for six weeks by a local physician." Patient hypnotized by Dr. Garretson and commanded to speak. She did so. Was told, while in hypnotic state, that she had been cured and would be able to speak from then on and that the trouble would never return. To date she is entirely well and is working as a domestic. She has since been curetted for dysmenorrhoea, and had her appendix removed, but has not again lost her voice.

Discussion on the Paper of Dr. Richard Frothingham.

Dr. John N. Mackenzie: In regard to the use of sudden suggestion in this class of case I would like to say a word. We have all had cases in which all forms of therapeutics, hypnotism and everything else have had no effect, but if in a case of this sort we can suddenly suggest something it frequently has the desired effect. About three years ago a girl of twenty-three was sent to me from the South with a typical case of complete functional aphonia. She had been all over the country consulting various specialists, and during the course of her journeys had acquired considerable wisdom. As soon as I got the history I saw it would be impossible to do anything, that no form of therapeutics would be effective. So, signalling her mother, who accompanied the patient, I turned quickly on the girl (she was staying at the house of a mutual friend) and said: "My telephone number is

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4059 Mount Vernon. Go home at once. Go straight to the 'phone in the hall and call me up." In about fifteen minutes the telephone bell rang and the most beautiful Southern voice I ever heard came over the wire.

This result lasted for about eight or ten months; she then had another attack. I was written to and I advised hypnotism. This was carried out with the result that her voice returned. This lasted for some time; then the aphonia reappeared and she was brought to Baltimore, put on the rest cure and three months ago her voice was still intact.

The point I wish to make here is the value of *sudden* suggestion in obstinate cases.

Dr. George A. Leland: The case reported by Dr. Makuen is the only instance occurring in a man which I can now recall. I think the cause may often be excessive use of the voice in one in a nervous or in a run down condition. In one case under my observation, that of a nurse in our hospital, on examining her throat I found that the perfectly normal vocal cords came together, but did not stay there. I left the examining chair saying that in that clinic aphonic lady patients were allowed to keep silent as long as they pleased, pro bono publico, or words to that effect. This raised her ire and she departed, soon to regain her voice herself. In another case, also a nurse, a spare, frail, weakly individual from childhood, being much fatigued toward the end of her course, the whispering had lasted for some days; she also had a fourth tonsil tickling the epiglottis; larynx normal. I undertook to administer a shock at the moment of phonation, hoping to surprise her voice back again. So when one of my assistants was looking down her throat I struck her back a resounding thwack, but without the desired effect. I therefore decided on a more costly measure and in her hearing told the assistant superintendent of the hospital that it would be necessary for her to return to her home in the country and remain away from the hospital for some months in order to effect a cure. This brought her to the realization that such a long absence from her hospital training would set her back and was sufficient to effect an immediate cure. Such cases in my experience are thus often successfully treated through mental impression; and the only difficulty is to find out how best that can be applied.

Dr. G. Hudson Makuen: The case to which Dr. Frothingham refers was one of a man who was injured on a railway train. He was on the roof of a moving freight and was struck in the supraorbital region by a live electric wire. He was slightly burned at the point of contact with the wire, and he was thrown rather violently to the roof of the car. The patient was referred to me

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by Dr. John K. Mitchell, from the Orthopaedic Hospital. He had not spoken a word since the accident, and although we worked with him for several weeks, we were unable to get him to do more than attempt to make some whispered sounds, no phonation seeming possible. His voice finally came back to him in the middle of the night in the hospital during some sort of mental excitement. He had something like a nightmare, and when he awakened he could speak as well as ever. Moreover, his recovery seemed to be permanent, and he felt sure that his inability to speak would not return. The explanation of such phenomena is rendered more simple when we recall that the innervation for the act of phonation is of central origin, and that the phonating and articulating areas are so closely related to the intellectual and emotional areas of the brain that a mental or emotional shock may cause aphonia, and a somewhat similar mental or emotional shock may be necessary for the restoration of phonation to one who has lost it.

Phonation is to some extent a matter of will power. It is a voluntary act and those who are hysterically aphonic are so because they cannot will to phonate. In other words, they are afflicted with a functional disease of the will known as abulia. They cannot phonate because they cannot will to phonate. Hypnotism or even suggestion often temporarily restores this power of willing to phonate, and associated with other remedial measures, it is frequently of much value.

Dr. Richard Frothingham (in closing): With regard to Dr. Leland's remark that he had never before heard of this condition occurring in a man, I would like to call attention to the fact that an eminent surgeon in Boston some years ago was troubled with aphonia; he had the faradic current applied and his voice was restored.

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RECURRENT LARYNGEAL PAPILLOMA.

BY G. B. HOPE, M.D.

From its mention, "recurrent papilloma" has very much given rise to the impression of a distinct form of papilloma that possesses in itself an unusual and determined disposition to a rapid return, and, in consequence, requiring a different and more radical treatment in order to secure a permanent removal.

There is certainly what seems to be an irregularity in these growths, their onset and disappearance, that has for long made of them a popular subject to fall under the influence of some favorite fetich. If an average record could be trusted with even a narrow margin of accuracy, there would yet remain sufficient to justify the popular belief, and to disturb all reliance upon the rules that govern growth formations. Such instances, however, usually are drawn from the exposed dermal papilloma. While a causation principle remains unknown the pathology has been sufficinetly fixed to relieve them from the dread of impending infective or malignant base, no matter how they may be handled, or in whatsoever position they may be located. It is now agreed that it is purely from a mechanical or functional point of view that they come into a prominence, and their removal becomes of a greater or lesser importance.

So-called recurrent papilloma have, under all circumstances, been found to retain precisely the ultimate structure as those that afford other histories of a ready disappearance under a simple form of treatment, and, it is believed, owe their obstinate nature largely to some of the unusual difficulties that protect them. Likewise, an incipient growth is often quite as uncertain in its radical removal for the good reason that its boundaries are not clear and instruments cannot be fitted with the precision and thoroughness desired. Also, in this class fall those of the sessile extended, covering, for instance, the cord and rounding the free margin.

As to the frequence with which papilloma return, statistics

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must give a wide variation, inasmuch as different individuals indulge in different methods of treatment, instruments selected according to different ideas of practice and with all the varying degrees of dexterity; but, taking all in all, the exceptions from the typical are so rare as to be really surprising and serve the more to strengthen the impression that as they are independent of any unusual structural formation that can be recognized, the difference may lie with the insufficient operation, whether by forceps or otherwise. In fact, Morrel Mackenzie, in his work on laryngeal growths, expresses the view that a return of such papilloma is not a true return, but a new growth from adjacent structures. In a series of carefully elaborated histories in which he presents sixty-seven consecutive cases, there were four such instances, and adds "two others where the neoplasm was not entirely eradicated and there was a rapid and considerable increase of the remnant."

In passing along in the review of this interesting subject it has always seemed remarkable that during the days that antedated the employment of cocaine the results were of such a character as to compare, with hardly a disadvantage, with those of the present, and emphasize in a strong relief the patience and skill of the masters of that time.

Some years since there came to the hospital a young woman who had then recently completed two years as an inmate of the Brompton Hospital, England. According to her account she had become afflicted with a laryngeal papilloma of such a character as to render her largely aphonic, with seizures of a serious dyspnoea at intervals. During the two years of her hospital term a large number of evulsion operations were done, but always to be followed by such rapid recurrence as to be of but little or no prolonged benefit. Consequently at the time of her visit here the evidence of the growth and the functional disturbance agreed perfectly with all the points of an earlier history, and incidentally as such giving rise to the expression of the "necessary recurrent papilloma." Nevertheless in four sittings every portion of the growth was removed with cutting forceps, and in two weeks the patient was dismissed to return to her work as mill operator at Fall River. The case continued under observation during several years, and with but one minor outgrowth there was to the last nothing that would have suggested the presence of a neo-

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plasm nor a voice in any way impaired. Naturally the recital of one or even several instances of the same character is not to be accepted as proof that there are no underlying characteristics with other papilloma that give rise to a rapid proliferation, but yet it does establish the fact that with the clinical history that would appear to abundantly illustrate this same latent disposition, at another time in different hands it may readily give way and take its place among those having a usual and pleasing ending. As with other growths that are incompletely or imperfectly removed, the same conclusion is not uncommon, and results can be correctly measured by such standard of success.

While the acknowledged reliance for the removal of benign laryngeal growths is placed with instrumental methods, there are excellent reasons to combine with them such topical medicinal applications as seem, when used externally, to have an influence in retarding re-development. The list is not a short one, but certain disadvantages attending many pigments that might be selected and particularly those of an active chemical nature, have made them for the most part, of a tentative nature. Following a secondary operation with cutting forceps upon an unusually difficult case of the extended sessile variety, and repeated for several days after, the official compound tincture of iodine was applied. How much the result may have been due to the combined treatment no one may say, but, notwithstanding the very unpromising nature of the case, the physician into whose hands the patient passed was able to report four months later a highly satisfactory outcome. Although this solution has not been included among those recommended for their alterative effect in this connection, it has in a diminished strength become one of the best known in many chronic laryngeal affections in which a modified circulation has been desired. The severity of the application is not at all of the degree that might be supposed, as by means of the brush it can safely and accurately be placed without the danger of spasms or of unusual reaction.

These notes are recorded as the results of such personal observations as have come in the course of a considerable number of cases, all of which have fallen under the head of those readily operable and without assignment to a class included by the term "recurrrent papilloma."

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CONTRIBUTION TO PASSIVE IMMUNIZATION IN DIPHTHERIA OF THE UPPER RESPIRATORY ORGANS.

(*Preliminary Report.*)

BY HENRY LEWIS WAGNER, M.D.

Induced by the experiment of S. Dserzgowsky* in the active immunization of the upper respiratory tract against diphtheria I have tried, on a small number of patients, local passive immunization in acute diphtheria, with results that may be of general interest.

In making these experiments I had two objects in view: (a) to study the effects of the antitoxins on the diseased tissues when locally applied, with the end in view of ascertaining whether results might not be obtained analogous to those now proving so successful in the influencing of infectious meningitis by intralumbar injections**; and (b) to endeavor to prevent or at least to modify the anaphylaxis following the use of high potential serum when applied in small quantities and at brief intervals during the initial stages of the treatment.

The following is the method I have selected and used: Whenever the patient did not show an absolutely clear picture of diphtheria vera secretions were taken from the throat, and from the nasal passages as well, for bacteriological examination. The nose and throat were then sprayed at fifteen minute intervals with the strongest serum combined with a 3% watery solution of calcium chloride in the proportion of 1 to 2; 5,000 units of serum being used within the first three hours. Later the amount employed was determined entirely by the prevailing conditions between successive sprays being lengthened.

*See his last report in Berliner Klinische Wochenschrift, 1910, page 2042.

**As contrasted with the method of subcutaneous or venous injections.

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In this treatment I attach especial importance to the spraying of the nasal passages as the lymphatic system of the posterior lateral portions of the nose influences the entire area of the Waldeyer glandular ring, embracing the throat and upper larynx.

Whenever the nose was obstructed by swelled tissues a diluted suprarenal capsule solution preceded the serum and calcium chloride application, so as to permit the latter to enter the inflamed hollows and crevices.

In cases where examination disclosed the presence of diphtheria, either plain or mixed form, the results from this local treatment were very gratifying; after a few hours the intense venous hyperemia became less; the odor was less fetid and the subjective symptoms were improved—the disease became localized and did not show any tendency to spread further down.

When the disease presented itself at the first inspection as already quite developed, subcutaneous injections of high potential serum were combined with local immunization; comparatively fewer injections were needed—the number being entirely governed by conditions of the affected parts and of the heart.

The question arises how does the antitoxine, when applied locally, react on the locus morbi? I do not believe that the antitoxine colloids combine here locally with the haptophore group of the toxine-molecule as the toxines are continuously being carried away by the blood and lymph stream throughout the body; very probably we are dealing here with a process of phagocytosis by the aid of bacterio-tropines.

The addition of calcium chloride to the serum was made with the intent of preventing or lessening the serum disease (anaphylaxis) either in its early or in its late form. With this, however, I have been less successful, though I continue to use this combination, as calcium ions act as an antiphlogistic (Leo), stimulate the heart (Leo), and increase the power of blood coagulation (Wright).

Apropos of this last point Weiss and Tsuru have found the index of blood coagulation lowered in diphtheria—a condition I have observed may persist for some time—and this fact should be given careful consideration whenever a resort to surgical

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treatment is deemed necessary in the case of a patient who is convalescing or has but recently recovered from this disease.

I have no difficulty in accepting the view that local passive immunization will lessen the number of diphtheria germ carriers a most welcome result in view of the fact that this latent form of the disease is very difficult to exterminate.

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PROGRESS IN THE TREATMENT OF LARYNGEAL CARCINOMA SINCE THE ORGANIZATION OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

BY J. SOLIS COHEN, M.D.

Your President has requested from me a paper on the "Progress in the Treatment of Laryngeal Carcinoma Since the Organization of This Asociation." It need be but very brief.

In 1878 the treatment of laryngeal carcinoma was mainly symptomatic. The chief surgical features in advanced cases comprised, on the one hand, prophylactic tracheotomy to secure respiration and avert suffocation, and on the other, removal of exuberant masses with forceps or with curette to facilitate deglutition. In cases of minute dimensions the general practice was to remove the growth intralaryngeally with forceps or curette and cauterize the base; or to destroy the growth with the electric cautery. The medicinal treatment was symptomatic save for the systemic administration of arsenic, then considered to have some effect in retarding the progress of carcinoma.

Nevertheless, serious attempts at radical procedures had been employed for a number of years before the organization of our association. Thus in cases of limited and fairly circumscribed dimensions a number of surgeons preferred to split the larynx in front, stretch the wings of the thyroid cartilage asunder, and then dissect the growth out with a zone of apparently healthy tissue, and cauterize or scrape away the tissue from whence the growth had been removed. This, with certain technic modifications, still remains the best method of treating intralaryngeal carcinoma of moderate dimensions, although it was unappreciated for many years. In large growths seriously involving the larynx, and in some instances adjacent structures, occasional operations had been performed, removing the entire larynx, or considerable portions of it, and sometimes with more or less extensive portions of surrounding invaded structures. In those early days, however, despite an occasional example indicative of absolute

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success, the majority of cases thus treated perished from causes directly attributable to the operation and its sequences, so that it was very doubtful whether the slight gain in the few successful instances compensated for the absolute loss of life in the many more who perished prematurely as the result of the interfering procedure. For many years statistics of published cases proved the truth of this statement.

As the technic of operation and of the post-operative handling have become more thoroughly improved, this discrepancy has largely disappeared, and for some years we have confidently anticipated satisfactory results in the majority of cases, provided they have been properly selected. If improperly selected, it is still far better that radical measures be avoided and the symptomatic treatment adopted with precautionary tracheotomy as requisite.

A practice has arisen in cases of moderate dimensions, to split the larynx, and destroy the growth bodily by one of the electric procedures, electric, cataphoretic, fulguric, Roentgenic, and even by radium; but these methods are incomparably inferior to the knife or the scissors. Two of the great dangers that threatened success after satisfactory performance of an operation for carcinoma of the larynx were recurrence of the neoplasm in all cases, and mechanical or surgical pneumonitis in cases of absolute excisions of the larynx. The danger of recurrence has been lessened by the dissemination of laryngology among the profession rendering it every day more likely that the lesions will be recognized long before they become unamenable to treatment, so that they can become eradicated while still limited in extent and easily accessible. It has been lessened by taking advantage of the fact that cartilage long resists the ingress of epithelioma so that comparative immunity from recurrence *in situ* may be secured by a technic in operation first described in the Transactions of this Association, namely, thyrotomy, removal of the growth and a healthy zone of tissue raised up in mass after stripping the perichondrium from the cartilage with a blunt dissector. This is far better than the earlier plan of cutting away the growth and then scraping tissue down to the perichondrium, or deep cauterization of the surface from which the growth has been cut.

Another procedure similar in conception and in intent applica-

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ble to more extensive lesions, but which has not yet received much consideration, was described in our Transactions more than twenty years ago, and consists in removal of the entire respiratory portions of the larynx, leaving the undiseased thyroid cartilages undisturbed to perform their functions as shields.

As regards the dangers from septic pneumonits: these have been largely eliminated in complete laryngectomy by adopting a device also described long ago in our Transactions, consisting in cutting the trachea loose from the larynx and fastening it in the front of the neck, thus cutting the respiratory tract off entirely from the alimentary tract, and avoiding the escape of food into the air passages, while at the same time it renders unnecessary the use of a tracheal cannula. These, gentlemen, are the chief points of progress in the treatment of laryngeal carcinoma since the organization of the American Laryngological Association.

Discussion on the Paper of Dr. J. Solis-Cohen.

Dr. Harmon Smith: I simply want to give additional history of a case of interest to this Association. In 1896 Dr. Gleitsmann presented a history of this case with a diagnosis of laryngeal carcinoma. Three summers ago I presented before the annual meeting at Boston an additional history of this case with microscopic slides both of the tumor before removal and of the larynx after laryngectomy had been performed. The case then disappeared for two years, and just recently I have again been able to locate it. The patient is in good health, and it was only found necessary to renew the tracheotomy tube.

Dr. C. W. Richardson: This paper hardly requires any discussion, but one point which I particularly wish to refer to is in regard to thyrotomy and the method suggested by Dr. Solis-Cohen. I think it one of the most admirable operations for true intrinsic carcinoma of the larynx I have ever done. I have done three of them and all have been, so far as local effects are concerned, attended with perfect results. The last one I operated on brings in another question which is equally interesting, and that is the possibility of the transformation of a benign into a malignant growth. This is a little out of the province of the paper, but this case dated from childhood as a papilloma and was repeatedly examined, and proved to be a multiple recurring papilloma. The case has been under my care for eight years. This winter an enlarged gland, apparently, developed in the neck, examination was again made of the growth, and it was proved to

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be a glandular carcinoma; also the glands in the neck proved to be glandular carcinoma, and thyrotomy was done, and the condition of the patient, so far as the laryngeal operation is concerned, is perfect, but needless to say, it is progressing in the usual way of malignancy, extra-laryngeally.

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THE ACTUAL CAUTERY IN THE TREATMENT OF LOCALIZED TUBERCULOUS LESIONS.

BY GEORGE B. WOOD, M.D.

For some time I have felt that the actual cautery, and preferably the platinum wire heated by electricity, is by far the most efficient method of combating tuberculosis of the upper respiratory tract. The striking results which have followed its use in cases of pharyngeal tuberculosis have confirmed my belief in its efficiency. If a pharyngeal lesion is not too extensive and can be reached by the heat, I am of the opinion that if treated with the cautery it will in *all* cases heal promptly, at least such has been my experience.

The good results following the use of the cautery are equally great in the larynx, provided the lesion is so placed as to make it accessible to the action of the heat. The beneficial action of the cautery seems to reach distinctly beyond the area of destruction, and the resulting scar does not appear to be easily reinvaded.

Last Fall I removed with the cautery snare, for diagnostic purposes, a suspicious looking tonsil from an arrested case of pulmonary tuberculosis. The portion of the tonsil removed showed extensive typical tonsillar tuberculosis, consisting of minute young tubercles scattered throughout its extent. Five days later I removed the rest of the tonsil. The result of my examination of this last piece of tonsil was most interesting, and led me to make a small series of experiments on guinea pigs. The scar in the portion of tonsil removed was surprisingly large and apparently already made up of well developed fibrous tissues, and only after the examination of a considerable number of sections did I finally discover a single small miliary tubercle, and this seemed already to be undergoing fibroid change.

Experiments on Guinea Pigs.—The object of these experiments was to determine the histologic appearance of a cautery wound made through a tuberculous lesion. The series is somewhat

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short, but demonstrates certain peculiarities of the healing of the wound, which are important in relation to the cure of a localized tuberculous lesion.

It was desired to produce a superficial localized tuberculous lesion. For this purpose an attenuated culture of human tubercle bacilli, which had been grown through five generations on artificial media, was used. The culture from which the bacilli were taken was three weeks old.

On February 15th, one c. c. of an emulsion of the above culture was injected just beneath and into the skin of the abdomen of three guinea pigs. Each pig was inoculated on each side of the abdomen so as to make two distinct and separate lesions.

On March 7th, pig No. 1 showed marked induration of the inoculated areas, and on the left side there was some sloughing in the centre of the lesion. About three-fourths of the lesion was cut out on the left side and about half the lesion on the right side was destroyed with the electrical cautery. The piece of skin removed from the left side was hardened in Zenker's solution imbedded in parafin, and sections stained with hematoxylin and eosin. These sections showed a large central lesion of epithelioid cells with slight necrosis in the centre. Surrounding this were a few isolated discreet tubercles composed of epithelioid cells. There was very little tendency to the formation of giant cells, and there were numerous polymorphonuclear cells scattered throughout the central lesions and massing on the surface.

On March 13th the animal was killed, the lesions removed and hardened in Zenker's solution; sections were stained with hematoxylin and eosin, and also with Mallory's connective tissue stain. Microscopically the lesion which had been cut showed advance, and the skin was apparently adherent to the abdominal muscles, but there were no tubercles on the neighboring peritoneum. The burnt lesion macroscopically appeared to be healing and was not adherent to the underlying muscle tissue.

Under the microscope the cut lesion showed the ordinary histological appearance of tuberculosis without the formation of giant cells. There was considerable necrosis, some extension into the surrounding muscle tissue and some new fibrous tissue.

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There were a few new formed blood vessels, but no marked inflammatory reaction.

The burned lesions showed considerable tuberculous tissue, but around the margin, where the slough following the cauterization had come away there was a marked inflammatory reaction. There were numerous new blood vessels, most of them were filled with blood, and the formation of new fibrous tissue was very marked. Outside of this zone of reaction the tuberculous tissue appeared apparently unaltered, and there were some tubercles in the surrounding muscle.

Pig No. 2—March 28th, cauterized both abdominal lesions.

March 31st, pig killed. The skin lesions were removed and hardened in Zenker's solution. Sections were stained in hematoxylin and eosin. The inguinal lymph glands were enlarged and caseous. On both abdominal lesions the eschar was still adherent and there seemed to be a slight shrinking in size of the tuberculous area since they had been burned.

Microscopically the lesions showed a considerable area of tuberculosis unaltered, except in a zone surrounding the base of the eschar. Here the inflammatory reaction was fairly well marked and the new blood vessels, while not so numerous as in the burned lesion of pig No. 1, formed a distinct zone, many of them being filled with blood. There was some tuberculous infiltration of the surrounding muscle tissue.

Pig No. 3—March 26th, cauterized both abdominal lesions and punctured an enlarged right inguinal lymph gland with cautery point. The node was completely caseous, a large quantity of the material escaping when the platinum point went through the capsule.

April 17th, pig killed. The lesions in the abdominal wall and the left inguinal lymph gland was removed and placed in Zenker's solution. Sections were stained with hematoxylin and eosin and Mallory's connective tissue stain. Macroscopically the lesion on the left side of the abdomen showed a healthy, shallow, raw surface without induration, and probably was caused by breaking a partially healed wound by rough handling. The wound in the right side of the abdomen was so nearly healed that it was difficult to find until the hair had been removed from the part of the abdomen. There was a slight induration along

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the scar, and at one end there was a small crust, which showed the wound had not completely healed. There was beginning a general miliary tuberculosis.

Histologically the left wound appeared as a shallow ulcer with a small amount of necrosis on the surface and numerous polymorphonuculear leucocytes. There was some tuberculous tissue in the immediate neighborhood as evidenced by the presence of epithelioid cells. The right wound showed a healed surface with a rather large deposit of fibrous tissue, but underneath this a small area of epithelioid cells. The inguinal lymph gland showed a small, healed, punctate scar, but it was so completely caseous that the histologic study did not show anything of interest.

Summary.—In three days after the cauterization of a low grade tuberculous lesion there developed a distinct zone of inflammatory reaction around the area of destruction. This reaction was manifest by the presence of newly formed blood vessels, congestion and fibro-blasts. Beyond this zone of reaction the tuberculous process seemed unaltered. In six days the zone of reaction was much more marked, the blood vessels being more numerous and larger, and there was a distinct deposit of fibrous tissue between the epithelioid cells of the tuberculous mass. The tuberculous process beyond the zone of reaction was apparently unaltered except that it seemed for some reason less in extent. In twenty days the lesions were to the naked eye almost healed. A fibrous cicatrix had formed in the zone of the inflammatory reaction, and, though there was some tuberculous tissue still present beneath the scar, the amount was very small and becoming gradually cicatrized.

These few experiments seem to have substantiated certain clinical observations as regard to the use of the cautery in treating localized tuberculosis. There is no doubt but that a retarding influence is exerted beyond the area actually destroyed by the heat. We know that a tuberculous nodule heals by cicatrization, and therefore anything that aids in the formation of fibrous tissue aids in the cure of the disease. Further, by the induction of acute inflammation with the consequent formation of new blood vessels, nutrition is brought to a part which would otherwise break down into a necrotic mass because of a lack of suf-

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ficient food to nourish the tissues. Again the eschar produced by the burning prevents reinoculation until the tissue has become sufficiently resistant to protect itself. Also the cauterization seals the lymphatics and blood vessels, thereby preventing a spread of the disease either locally through the lymph system or generally through the blood vessels.

Dr. George B. Wood (in closing): I desire to treat this subject merely from a histologic standpoint to show what were the tissue changes occurring in and around a cauterized area of a tuberculous lesion. The important point developed from these experiments is that an inflammatory reaction occurs in a zone immediately around the area destroyed by the cautery. This area or reaction is localized and persistent. Clinically, the reaction following the use of the cautery seldom occasions any discomfort to the patient except the pain; that is, there is little or no edema and never sufficient to in any way interfere with respiration. With regard to Dr. Simpson's question a tuberculous ulceration is simply a tuberculous lesion near the surface which has advanced to such a degree that the caseous centre was opened on to the surface. An infiltrated lesion, however, does not necessarily progress to an ulceration.

Discussion on the Paper of Dr. Wood.

Dr. W. K. Simpson: I would like to ask Dr. Wood if the cauterization pertained to indurated as well as to ulcerating areas, as I understood him to say only to ulcerative areas.

Dr. George L. Richards: I started out to treat these cases with the same feeling that Dr. Getchell has just expressed, and very much to my surprise I find the reaction is less than after other methods, and the recovery of the voice is much quicker. The patients usually come back in four or five days feeling much better. I have a young woman under my care now who has some constitutional symptoms which are fairly active, she is an ambulatory case with aphonic voice, and after four or five applications of the galvano-cautery, which she found a practically painless treatment, she has a useable voice. I have treated her by other methods with not nearly such good results. When in Europe I saw the galvano-cautery used quite a little and I came home much in favor of it.

Dr. A. C. Getchell: This question of the local treatment of the upper air passages for tuberculous lesions should be based on the consideration of the general condition. I will not go into the subject whether there may be tuberculosis of the larynx with-

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out systemic infection, but I have investigated a good many cases and as far as my experience has gone I have never known it to occur. If the constitutional disease is active I think as a general principle the treatment should be of the mildest nature. There is no objection to a man with the experience of Dr. Wood treating a local lesion of the larynx or pharynx with such an active agent as the galvano-cautery, but I think it is not well for the impression to go abroad that at any and all times it is a proper method of treatment. If the constitutional condition is in abeyance and the general condition of the patient is good, if the local lesion be of sluggish character a stimulating treatment may be and undoubtedly is a proper procedure, but under other conditions I do not consider it proper.

Dr. W. E. Casselberry: The essayist, Dr. George B. Wood, has earned our gratitude by producing experimentally scientific and definite confirmation of what has previously appeared to us as a clinical fact, i. e., the healing effect of cautery puncture in tuberculosis of the larynx to an extent of tissue beyond that immediately destroyed by the cautery point. Regarding the constitutional nature of laryngeal tuberculosis, the argument when applied to treatment is fallacious, for though practically every case of laryngeal evolvement is accompanied by pulmonary tuberculosis and therefore is a part of a constitutional disease, the actual fact is that laryngeal tuberculosis, by reason of its particular location, at a point to cut off both food and air, becomes a rapidly fatal local element, causing the patient to weaken for lack of nourishment, and he dies of his constitutional disease more quickly than if there were not the complication of the local lesion. Therefore, if the laryngeal lesion be brought under control one conserves the physical forces of the patient and thereby treats in the most effective manner the constitutional disease, not neglecting, of course, the general systemic management. In skilled hands cautery puncture is to-day accorded first place among surgical methods, being especially suitable and usually unobjectionable for unbroken, not very diffused infiltration. Recently, however, I have had a case in which, after a single deep cautery puncture, there was considerable inflammatory reaction, distressing enough to the patient to cause me to substitute other remedies, which eventually produced a good result; the inference being that a distressing reaction, though unusual, is a contra-indication to the use of cautery-puncture in laryngeal tuberculosis, other contra-indications being advanced or generally diffused ulcerations, a degree of stenosis productive of stridor and oedematous exacerbation. On the whole, however, the cautery is the best remedy in the hands of skilled laryngologists, especially for moderately circumscribed infiltration.

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CONGENITAL WEB OF THE OESOPHAGUS—REPORT OF A CASE.

BY J. PAYSON CLARK, M.D.

The following case has seemed to me of sufficient interest to be recorded, if for no other reason, on account of its apparently unique character.

Miss B. K., aged twenty-four, domestic, was referred to me last November with the following history: Her general health had always been good. She had never had any serious illness. From her earliest recollections she had always been obliged to eat very slowly and to mince her food very fine. There was no history of trauma. A year before I saw her she had had a bad attack of choking, following an attempt to swallow a small piece of meat.

Since this attack she had been unable to swallow anything but liquids. In April, 1910, she saw a specialist, who referred her to the Massachusetts General Hospital for examination. She did not go then, however, but consulted another physician, who gave her medicine. This afforded her no relief, and she was advised to consult me. She was a well developed, well nourished girl, of average height. She appeared very nervous, so that my first idea was that the condition might be an hysterical one. An attempt was made to pass a flexible bougie. Several sizes were tried, but all were arrested, apparently, just back of the cricoid. Examination with a Jackson's tube spatula under local anesthesia was tried without success, largely on account of the nervous condition of the patient. This examination was in the afternoon. In the evening the patient came again to my office, much alarmed, because she had been unable to swallow even water since the examination. I then arranged for her to come to the throat clinic of the Massachusetts Hospital the following morning for an examination under ether anesthesia. On arriving at the hospital she said she had been able to swallow absolutely nothing since the previous afternoon. Under ether anesthesia,

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with the patient in the Rose position, a large Jackson tube spatula was introduced back of the epiglottis and the whole larynx elevated. This revealed a strange condition. A rather shallow pouch, formed apparently by the union of the mucous membrane of the posterior and lateral walls of the pharynx with the mucous membrane of the posterior surface of the cricoid was to be seen where the opening to the esophagus should have been. A little to the left of the centre of this pouch was a small opening, presumably communicating with the esophagus. This opening appeared not more than 3 to 5 mm. in diameter. With the object of determining, if possible, how thick this membrane was, I decided to put it on the stretch by the careful introduction of a large size esophagoscope. I placed the esophagoscope back of the cricoid and began to stretch the membrane while I observed the effect. Suddenly it gave way and the esophagoscope proceeded with ease into the esophagus, and for its whole length without meeting any other obstruction or abnormality. There was almost no bleeding from the rupture of this "hymen" of the esophagus, and the delicate remains of this membrane made a very insignificant appearance, for the most part shrivelled up on the posterior pharyngeal wall.

There is very little more to note about this case. The patient, never having had a real good swallow, was a little timid about it at first, but soon got over that, and now, six months after the operation, if my manipulations can be so designated, says she swallows as well any one.

As far as I have been able to discover, no case similar to this has ever been reported. Green's Encyclopedia and Dictionary of Medicine and Surgery, 1908, under "Malformations of the Esophagus," says: "These are very rare and of no great practical importance." The article goes on to mention total absence of the esophagus in a new-born child, also absence of a portion of the esophagus, the two ends being usually united by a thread of fibrous tissue. Further: "Congenital stenosis of the esophagus at its commencement or at the cardiac end has been described." Osler's Modern Medicine, 1908, does not mention this condition. I have been through the Index Medicus since 1908, but can find no reference to such a case.

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Discussion on the Paper of Dr. J. P. Clark.

Dr. Harris P. Mosher: This case interested me very much on account of its rarity, and because of the difficulty of making a satisfactory examination of the upper end of the esophagus.

The fact that Dr. Clark has been unable to match his case in the literature shows that such a case is very uncommon. I have a feeling, however, that we shall find as time goes on that partial webs of congenital or cicatricial origin are not so uncommon at the beginning of the esophagus as we now think. Once or twice in the past I have thought that I was dealing with such a web only to have it disappear before the examination was over. In one of these instances a small abrasion was all that remained of the apparent web after the tube was finally passed. If such webs do exist they would explain certain slight affections of the esophagus which are now put down to neurasthenia. The passage of a bougie would break the web and cure the patient and establish the diagnosis in favor of nerve upset. The treatment would be right, but the diagnosis wrong.

The beginning of the esophagus is hardest to examine and is the most difficult part in which to be sure of what you see. In shape it is like a funnel, and the mucous membrane and the muscular tissues beneath lie in loose and redundant folds. When the esophagoscope is introduced into either one of the pyriform sinuses it is liable to push a fold of mucous membrane ahead of it, and this fold looks like a partial web. A bent probe can be made to hook round it the same as in the case of a permanent web. After a recent experience with an artificial web of this kind in a case of cancer of the upper end of the esophagus I took a wet specimen of the pharynx, larynx and the upper end of the esophagus and experimented upon it with tubes. It proved to be very easy to make these artificial and temporary webs.

A few months ago I came across a true web of the upper part of the esophagus. There was a doubtful history in the case of the swallowing of some caustic. The patient had had trouble with swallowing for fifteen years. The examination disclosed, about an inch below the cricoid cartilage, a thin web which surrounded the esophagus. It was in the form of a diaphragm with a small central opening. The nature of the web did not become clear until I put the mechanical dilator through the lumen of it, spread the dilator and pulled it back a little. The manipulation put the whole diaphragm on the stretch and made its true character plain. This procedure suggests a method of examining the upper part of the esophagus which should help markedly in determining the presence of true webs. It might be called retrograde dilatation and examination. By it all adventitious folds

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are done away with by the opening of the esophagus. In the case of the web which was just mentioned, after the diaphragm was put on the stretch, the ring of tissue was divulsed by pulling the dilator up. After this soft bougies were passed at intervals three times. The patient was quickly and easily cured.

Dr. H. L. Swain: I saw a case which I thought might be a web, and I do not now know what it was unless it was a cicatrix. The man had swallowed a staple, and after two years the staple was coughed up, and since this happened, which is about three years ago, he had more or less difficulty in swallowing, which gradually increased. We tried to introduce an esophagoscope and each time it would go down to a lip that seemed to be a little off the centre, and we could not get the instruments by this. It did not look malignant, although inflamed. This was on first examination; then to see how patent it was we took a large soft bougie with a small end, and found we could pass a good sized one, and even a stomach tube. I conceived the idea of an X-ray picture with a leaded stylet, leaving it in while radiograph was being taken. We found a marked deviation from the central line, and it was this deviation upon which our straight instruments lodged and turned the fold of mucous membrane down so that we could not get by it.

This man, unfortunately, left the hospital before anything more was done and I have lost track of him. He could swallow much better for the manipulations.

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OZENA—NUTRITION AND RESPIRATION.

Etiology and Pathology.

BY MARCEL NATIER, M.D.

I.

The eloquence claimed for figures is sometimes misleading. In reality the results of statistics are not always wholly beyond debate. Scientific work has, above all, need to be built up slowly, lest time shows it to be incorrect.

Toward each circumstance to which attention is attracted and held one ought to force oneself to proceed with perseverance to the methodical study of phenomena, in order to discover their causes, in order to neglect none of their divers aspects, and in order to bring to bear upon them no other opinions than those dictated by personal experience carefully controlled.

Thus operates the proper preparation of materials which one can plan to utilize with profit if there be opportunity. Clumsy volumes are often filled very easily; it is not rare that they are entirely devoid of interest—on the other hand, numerous facts in appearance very simple, well presented, very clearly stated, judiciously co-ordinated obtrude themselves regularly upon thought and are helpful to science.

Forgetfulness of the general laws which govern pathology is unfortunately common. Too much importance is attached to the symptoms of disease, and not enough attention given to its origin. From which in my opinion arises the incessant controversies concerning the etiology of ozena. In spite of the wealth of hypotheses successively advanced, the question nevertheless seems to have hardly progressed.

The pathology of ozena has haunted my mind this long while; and observations have imperceptibly accumulated which have led me to a distinct theory. In my work last year,* which was primarily concerned with the therapeutics of ozena, I gave a hint of my opinion of the causes of this repellant malady. It has only to

*Ozena and Respiratory Gymnastics. (Transactions of the Thirty-second Annual Meeting of the American Laryngological Association, 1910).

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do, I insist, with a general systemic disease, betraying itself by local disorders which, most often, lie within the nasal fossae, and more rarely, in some other portion of the respiratory tract.

One of those chances, rightly termed lucky, permits me to relate to-day a case of recent existence and one in which it is easy to trace the evolution. The details, interesting to every one, will certainly be yet more interesting for those whose ideas accord with mine. They will serve to illustrate, and I dare to hope, confirm my theory.

II.

History.—Boy, 19 years old. Came to consult me for Ozena, July 19, 1910.

Hereditary Antecedents.—Father, 43, small, very energetic; life exceedingly hard up to within the last five years; suffered from stomach trouble for a long while. Mother, 42 years, short, anaemic for some time; rather stout; very nervous. Both were Hebrews and distant cousins—with no nasal trouble.

Six children: three boys and three girls. The fifth died at four. The oldest daughter now 21 years of age, small, sickly, nervous, subject to frequent headaches. Nose continuously clogged: no hypertrophy, no adenoid growths, no bleeding. There appeared toward the fifteenth year an ozena which was constantly cared for by application of nitrate of silver and irrigations, but with no relief.

This sister, according to her brother, is totally incapable of the slightest application to work. No memory. Inaptitude especially evident for history, natural sciences and mathematics. A good musician, her lack of memory prevents her from playing anything by heart. Her studies, badly directed, had to be prematurely discontinued because of inability or apathy.

Another daughter, sixteen and a half years of age, in good health, but rather indolent.

A son ten years old, of moderately good health.

The last son, six and a half years old, in good health.

Personal Antecedents.—Fine child at birth. Born in 1891 in a small town of Bulgaria. Suckled by its mother at home, healthy for six months, then fell seriously ill; had "fevers," was treated with quinine and various remedies, in particular bismuth for incontrollable attacks of diarrhoea. Life continuously in danger up to two and a half years of age.

Talked at about eleven months; did not walk until about two and a half years old.

Did not becoome entirely normal until almost five years of age.

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Incontinence not only of the urine, but also occasionally of the faeces occurred during the day as well as at night. Punishment was recommended, but nothing was accomplished by it.

At two and a half years was frightfully emaciated; without strength, he could hardly move his arms. "Bones were out of joint." One hardly dared touch him because of his great frailty. Some gypsies staying in the vicinity came daily to massage him "in order to put the bones in place." Some warm hydropathic treatments at the time brought about the almost entire elimination of rheumatic pains in the feet.

At ten years, then, as always, thin and delicate, had a serious affection, probably respiratory in origin, for it was accompanied by a violent pain in the side. At the end of seven weeks there was rapid convalescence.

At fifteen years had a light attack of influenza at Sofia, where he had been residing since the end of his tenth year.

At sixteen years had bronchitis, which lasted eighteen months.

Until he was two years old "febrile fevers" occurred about every three months, lasting two or three days, and he was treated by small doses of sulphate of quinine.

He entered school at seven, learned to read as easily as the average among the children. During the entire period of his stay at the parish school, say from his seventh to his eleventh year, he could not learn to read Hebrew well, and the grammar, particularly, offered him insurmountable difficulties. He recognized the letters easily enough, but he did not grasp what he read. At present he remembers nothing of it. He had inaptitude for retaining new knowledge, above all abstract ideas as (Hebrew, mathematics, philosophy, history). Yet, thanks to considerable will power and great perseverance, he succeeded in concentrating his attention upon the most difficult subjects. But in spite of regular and constant effort he never succeeded in putting himself above the average. He was greatly affected by this failure, at which his parents were not less surprised. He admired and envied those who could devote their entire nights to study, which was utterly impossible for him.

From eleven to eighteen he attended the lessons at the Lycee. He was good in everything the first year, but weakened in the second year, in particular, failing to master botany. Third year was mediocre with the exception of French and gymnasium work. So it was to the end. To the list of marked subjects one should add grammar, which he detested in general, and over and above all, Hebrew grammar. Yet during the last year and while under the same professor, he began to like mathematics, which he grasped more readily. He even developed some excellence. Upon his de-

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parture from the Lycee his education was altogether insufficient. He has since forgotten a multitude of things.

He has now been in Paris ten months. He spends eight hours a day at his desk in the insurance company, where he is employed. He greatly prefers family life and active outdoor life. Is compelled to be content with mediocre food, both as to quality and quantity. No excess at any time.

No specific history. He had a slight gonococci infection for last six weeks, now upon the wane.

Very calm by nature. Has always been melancholy, probably in imitation of his father, who has had a hard life.

Headaches.—Rare and insignificant.

Sleep.—Excellent; sleeps on the average eight hours; awakes well rested.

Digestive Apparatus.—Salivation rather scant—appetite good and regular; in no wise capricious. At home, food fatty and spiced; till fifteen years of age he drank a lot of sour wine, of which he was very fond, as well as various indigestible foods. No trouble seemed to follow.

There appeared, toward the fifteenth year, stomach pain with flatulence, which increased. They came on, at first, at the beginning of the meal, being accompanied with languor, which suppressed the appetite. Finally coming on later, they did not make their appearance until four or five hours after the meal. Digestion seemed to stop and at times the crisis ended with vomiting. Periodic return of the disorders. They sometimes lasted several weeks, during which they did not produce but one or two vomiting attacks. Brought on by farinaceous, fat and stimulating foods, or by cold food or drink.

For the past two years and especially since his stay at Paris has had a tendency toward constipation. Sometimes two or three days pass without a movement.

Last year while preparing his thesis he lost five to six kilograms.

Respiratory System.—Keen sense of smell. Colds in the head very rare. In infancy he slept with his mouth open and druled during sleep. No adenoid growths; no hypertrophy of the nasal mucous membrane nor of the tonsils. Throat troubles slight.

The bronchitis of 1906 was due to a cold; was not serious, there was no suspension of studies. Began in the spring; grew slightly worse during the winter, improved during the following spring and ceased in the middle of the summer. Wheezing, difficulty in breathing, with suffocation. especially noticeable in the night, while in bed, when it was necessary to sit up to breathe. Dry, frequent cough, without expectoration. No fever. Nothing

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of importance followed except rales at the right apex, following fatigue, or after having breathed the sulphur of a lighted match.

The first nasal hemorrhages had lasted about two and a half years; at first unilateral, they then became bilateral. At the end of some months, their frequency increased and the nose bled as much as three times in the same day, and sometimes even at night. The patient soiled on the average two handkerchiefs a day.

Result: Great anaemia and *great loss of strength.*

In Paris, toward the middle of September, 1909, the attention of the patient was, for the first time, attracted by an abundance of crusts in each of the nasal passages. After various changes, in about a month, these crusts became larger, greenish in appearance, and acquired the characteristic oder of ozena. Real effort was necessary to bring about their removal, which was never followed by bleeding. They presented the shape of the nasal cavities. Two handkerchiefs were soiled each day.

Other Organs.—Normal. Slight diplopia at times, and also slight tinnitus aurium.

Previous Care.—When only ten years of age the patient commenced to practice gymnastics, to which he constantly devoted himself with sufficient perseverance. He derived from it considerable benefit, especially in the development of the chest, which was very narrow at the outset.

Previous History.—In Bulgaria the digestive disturbances experienced had been attributed to the dilatation of the stomach, and even possibly to appendicitis itself. Consequently one and a half liters of milk were prescribed for ordinary daily consumption, also curdled milk and rice—with milk. To that, arsenic was added as a tonic. But he had to give up this regimen, as the fluids caused decided discomfiture.

At Paris six months ago a physician diagnosed the dilatation and the passage of food with difficulty from the stomach into the intestine. He advised avoidance of everything which appeared to do harm, and the careful combating of constipation by purgatives. The sufferer found his stomach decidedly dilated, and besides, having little confidence in these remedies, he followed this advice but imperfectly, and therefore derived only slight benefit.

Local Symptoms.—Some months after their occurrence the patient went to a specialist in Sofia to get rid of his nasal hemorrhages. No attention was given the general condition; treatment was confined to repeated cauterizations of the nasal mucous membrane with solutions of nitrate of silver. Each treatment was ordinarily followed by a fresh hemorrhage, lassitude occurred, and after several weeks the treatment was discontinued. Blood never flowed very freely; yet two handkerchiefs were used

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daily. Finally it was pronounced anaemia, complicated with exhaustion.

At the end of August, 1909, a general practitioner administered a yellow draught in order to suppress these hemorrhages. A week later the flow of blood seemed to grow less, and it stopped temporarily after the application of the galvanic cautery in both nasal passages. No consideration of the general condition.

In the following October a leading Parisian specialist prescribed, for overcoming crust formations and for the subsequent discomfiture, irrigations and applications to the nose and throat of some ointments, gargles, and the administration internally of iodine. This practice caused irritation. In reality every morning on awakening there was a bloody oozing; during the day it was necessary to plug the nose continuously with cotton. Galvanic cauterization was necessary for the control of a bilateral hemorrhage.

In November a second specialist likewise prescribed salve and a gargle. Somewhat profuse hemorrhages followed twice after galvanic cauterization, the first the same evening of the application, the second three or four days later.

For the first time it occurred to a third specialist some time after to ascribe these hemorrhages to the general bad physical condition. He said that the blood was too thin: doses of chloride of calcium given internally, salve of perchloride of iron, and, eight days later, iodide of potassium were given.

Several injections of cacodylate of soda were given. The treatment was discontinued in January, for the nose no longer bled, the complexion was clearer and the general health bettered. His weight went up to 60 kil. and kept at that during February and March. It has steadily decreased since, and is not to-day more than 57 kil. The formation of crusts never ceased.

July 20, 1910—*Present Condition.*—Stature small (1.626m.), countenance intelligent, energetic; sallow complexion. Eyes sparkling and bright; cheek bones prominent, type Japanese. Mouth well formed. Appears overcome by fatigue.

Septum—Right Side.—In the lower part there may have been a perforation, of which at present one could not perceive hardly any trace. Nasal passages of normal size. Turbinates scarcely atrophied. Mucous membrane—thinner, but of the usual color. No apparent deformation of the nasal framework.

In the right nasal passage: Thick crusts hang from the nasal fossa, covering the inner surface of the inferior turbinate, covering also the floor and entirely choking up the inferior meatus. Dried, they made a veritable magma of thick mucous pus.

On the left in the middle meatus dry and crusted mucus is

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found covering the external wall of the middle meatus and the superior part of the convexity of the inferior turbinate. Nothing in the inferior meatus upon the floor. The sufferer did not state that he had expelled more crusts from the one side than from the other.

Atrophy is hardly noticeable, at any rate insufficient to show by anterior rhinoscopy the posterior pharyngeal wall. By posterior rhinoscopy there is constantly seen in the choanae, upon the posterior border of the septum, upon the posterior naso-pharyngeal wall, streaks of mucopus—very thick, but not desiccated.

Loosened, the scabs, greenish in color, emit that horrible odor characteristic of ozena.

Mouth.—There were many decayed teeth, for the last five years, in each maxillary. Tongue normal.

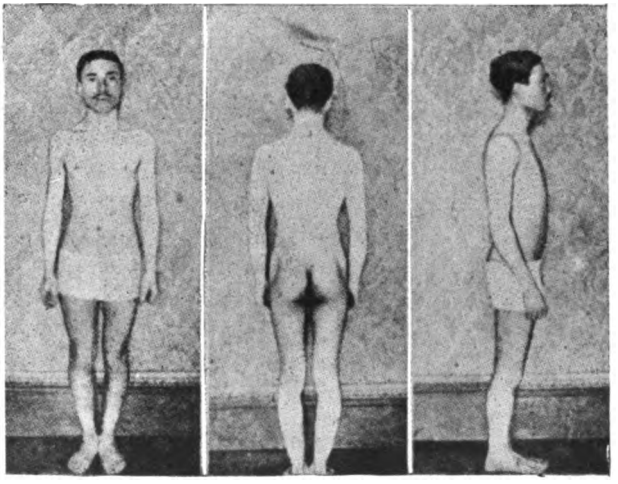

Fig. 1. Fig. 2. Fig. 3.

Pharynx.—Some granulations. Upon the posterior wall, neither smooth, nor thin, nor dried, there are analogous streaks to those of the naso-pharynx, but naturally less abundant.

Larynx.—Vocal cords rounded, slightly atrophied, leaving between them at the moment of the emission of sound a free space their entire length. No dry mucus in the larynx or the visible portion of the trachea.

Tonsils.—Small leucoplacic spot upon the left tonsil, with a retro-maxillary gland the size of a hazelnut, and on the same side. Nothing on the right. No hypertrophy.

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Voice.—Slight hoarseness for some weeks.

The photographs here shown give a general idea of the appearance of the *naked body.*

Skin.—A dull yellow look to the skin, which is, moreover, rough to the touch. Acne abundant upon the upper portion of the back.

Head.—Decidedly inclined forward.

Thorax.—Front aspect: Retraction very prominent under and over the clavicles. Ribs prominent. Flattening of the middle and inferior parts. Emaciation moderate.

Posterior aspect: Shoulder blades prominent posteriorly with a marked dorsal curvature.

Profile: Marked curvature of cervical dorsal region. Limbs: Quite well developed—due to the gymnastic exercises already mentioned.

Respiration: Chest hardly moves in ordinary respiratory movements.

Auscultation: Absence at the apices of the vesicular murmur, which is hardly perceptible at other points. Forced respiration at the antero-posterior portion of the right lung, where there is slight tubular breathing.

There is some interest to be found in the extracts from two letters which the patient sent me after his return to Sofia.

September 19, 1910: "By the sea side at Varna, where I went for the first two weeks of August, my appetite quickly returned. In twenty days I have taken twenty baths. My color has become rosy. As soon as I got into the open air all my functions, especially my digestion, on which you lay so much stress, became regular. My constipation, which was so obstinate in France, I am sure was due to lack of fresh air and my office life and a complete change of environment. I suffered, too, from being denied the comforts of family life.

"At home I have greater liberty and eat more at my ease. My diet is like everyone else's. Although I follow your direction, I take far less meat, for I notice that meat with me causes constipation. If it comes on, however, I massage myself and take a run of a kilometer or two. I never take any drugs, as I hold them in horror. With this regimen I rarely have any stomach trouble, and especially I have very much less colic than in France.

"Consequently, the nose is better. At present you would be surprised and yet, it is the exact truth, I hardly have any crusts for ten or twelve days at a time. Then they look about like those I had in Paris. The rest of the time small crusts without odor. My smell is perfect."

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March 31, 1911: "My stomach acts normally, although not perfectly regular. I have put on very little flesh, it is true. I have eaten and continue to eat very well, not much at a time, but three or four times a day. I have two natural movements a day; there is no trace of constipation, and, therefore, no need of medicine. After my day's work at the office not a trace of fatigue. A walk of an hour or an hour and a half permits me to work two or three hours after dinner without difficulty.

"In the morning my nose is a little dry; there are some small crusts, which are entirely odorless and are almost transparent. During the day, the discharge is not really crusts, but rather a yellow liquid mucous and odorless. My smell is perfect.

"Conformable to the ideas you have advanced in your brochure, 'Ozoena and respiratory gymnastics,' the hygienic measures are eminently efficacious, and as a matter of fact, in following your advice I have been cured. I should place exercise and respiratory gymnastics, in which I have practiced every morning, in the first rank; next comes good food and pure air."

III.

From the preceding history of this case how can we form an exact idea of the etiology of ozoena? In this, as in most other affections, we can invoke two sets of causes, a predisposing and an exciting. In the number of the first may be included the consanguinity of the parents, the precarious state of their health, the hard life to which they are frequently subjected for a long time. All this permits us in reality to foretell the future lack of resistance on the part of the children. As a matter of fact the family of this patient present many evidences of hereditary enfeeblement. The eldest daughter in particular deserves especial note, inasmuch as she also suffered from aprosexia and ozoena.

The history of the patient presents many useful suggestions.

When six months old a serious sickness which put his life in peril, retarded his development and brought on an enuresis which lasted until his fifth year. The child remained delicate and his health was still further weakened by a pleurisy, apparently, at ten years of age, by chronic bronchitis and by fevers more or less persistent. Aprosexia. At Paris his condition grew worse. Functional troubles successively appeared.

They became marked toward his fifteenth year, as to his digestive apparatus, and not less serious as concerned his respiratory organs. Among these latter was the development of ozena.

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Nasal hemorrhages, respiratory difficulty, caused by insufficiency of thoracic development, prepared the way for the development of offensive ozoena. This came on in its time, that is, at a time when the general economy was insufficiently nourished.

Let us follow now the course of events: severe, acute attacks of disease decreased the natural resistance, still further enfeebled by privations. Thanks to certain hygienic precautions, to appropriate exercise, the decline could be arrested, but it could not be escaped. The digestive apparatus gave way first, the normal equilibrium was entirely upset. The signs of a decline became general and plentiful. But let us confine ourselves to the consideration of the mucous membrane alone. Let us analyze the alterations of which it becomes the site in a change parallel with those of the organism in general. All regions were successively affected, epistaxis, ozena, bronchitis, dyspepsia, constipation. The friability of the pituitary membrane caused at first frequent spontaneous hemorrhages, then followed modifications in the secretions, which ended in ozena. And this gives me an opportunity of exposing my comprehension of the mechanism of this affection.

The crusts, as I have said above, had their seat especially near the upper part of the middle meatus and the upper part of the convex surface of the inferior turbinate. It is well to keep this situation of the lesion in mind: there are reasons for it. Other observers have also noted it. One among them has drawn very ingenious etiological conclusions from it, and has shaped his therapy accordingly, which will engage our attention.

Struck with this singular phenomenon, Professor Lavrand, of Lille, has, as a matter of fact, asserted: "The whole pituitary membrane therefore does not give rise to the secretions of ozena. Under such conditions we can only look on a lesion in the middle meatus as capable of producing the crusts." Also as the result of many examinations which had constantly revealed to him a necrosis of the ethmoid, this author felt warranted in concluding: "This having been established, ozena can no longer be regarded as an essential lesion in itself, atrophic or secretory trouble of a more or less mysterious nature, but the result of a chronic osteitis of the ethmoid with necrosis without sequestration of the diseased bone."

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Whence naturally comes the advice: "To curette the necrosed portion of the ethmoid, which is the source of foul smelling secretions and the cause of atrophic neuritis." The results obtained seem to have been satisfactory.

This sort of reasoning does not seem to me entirely without flaw, and therefore not entirely convincing. If the crusts are first seen and exclusively confirmed to the middle meatus, one might readily acquiesce in the reasoning. This meatus, as a matter of fact, represents the cross-roads where empty the maxillary sinus, the anterior ethmoid cells and the frontal sinus, all the cavities which deposit regularly their secretions there.

Now, far from being a negligible quantity, the role of the sinus is, on the contrary, after that of the general health always indispensable, even in the pathogenesis of *nasal ozena.* Why is this so? Anatomy and physiology will teach us.

The pituitary membrane is much thicker along the level of the points where it is found in contact with the inspired air and, inversely, thinner where its relations with that column are not so intimate. These differences are the result of an unequal development of the glandular and vascular tissues of the mucosa. The contact of the current of air, exposing it to the dangers of an excessive evaporation, is held in check by an excess of glands and blood vessels. On the contrary, there, where the evaporation is almost nil, in the sinuses and different anfractuosities, the mucosa is very thin, owing to the atrophy of the glands, the vessels and other constituents.

What occurs in the state of health and what in ozena? In the healthy subject, the secretions normally lubricate the pituitary membrane and favor the perception of odors; still more, they flow away in a quite natural manner. On the contrary, in atrophic rhinitis, the secretions thicken, become viscid, agglutinate and cling more and more closely to the underlying mucosa. Naturally, the less resisting portions of the pituitary membrane are the first to be affected. And thus, owing to its anatomical position, to its relative thinness, the mucous covering of the sinus has the sad privilege of being the first and, for a long time, the most deeply involved in the atrophic process.

This being granted, the secretions of the sinus mucosa encoun-

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ter at once a difficulty and a growing retardation in emptying themselves into the meatus, while, thanks to their greater physiological activity, the other parts are hardly modified. Nevertheless, during periods of varying length, violent blowing of the nose may suffice to keep it clear. But the condition grows worse, the secretions already thickened become encrusted through evaporation and adhere to the middle of the meatus walls.

By this time the ozena is firmly established. The patient must increase his efforts, and still he will not succeed in detaching the crusts except in the inferior meatus, and then not upon the lower portion of the inner aspect of the inferior tubinated bone. As for the upper portion of this body and the middle meatus, not fully affected by the air current, they will remain more or less encumbered. There will even come a period in which the atrophy of the nasal fossae becomes complete, when he has to resort to means considerably more energetic in order to remove the crusts which, without, will completely cover the walls with a thick coat throughout the whole extent of the nasal fossa.

The process, as we know, is not entirely limited to the nasal mucosa. It may spread to other portions of the respiratory membranes, and this well illustrates its origin as a general disease. In this way pharyngeal, laryngeal, tracheal and probably bronchial ozenas are seen. But it is well to note that these are simply different varieties and not different diseases. In the long run the atrophy involves not only the soft parts, but, as a sequence, the osteo-cartilaginous framework, on which account there arise necroses and perforations, wrongly regarded as spontaneous.

The same sort of reasoning applies to the mucosae of the digestive tract; thus one grasps the parallelism so frequent and even inevitable between secretory troubles of the latter and of the respiratory mucosa. For this reason the Spaniard is entirely right in designating both by a common term—*constipacion.*

This pathogenic conception of ozena offers several advantages. Pre-eminently it rests upon a foundation of anatomy and physiology, which is not its least merit, for it could not have better bases of support.

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General pathology thus brought into prominence permits us to comprehend the local troubles which lead to atrophy. This theory, not very important, may be generalized. For multiple causes so diverse in appearance and invoked a little at hazard, it allows us to substitute a common origin. Hence everyone, even the partisans of the doctrine of diatheses (syphilis, tuberculosis scrofula), as well as those of the serious infectious diseases (typhoid fever. pneumonia, etc.) receive equal satisfaction.

Can the ethmoidal theory boast of the same advantages? No, for it cannot raise its conception high enough. In the first place it gives no reason for the necrosis, *without sequestration*—even admitting that this condition actually exists each time—of which it is the fundamental condition. Furthermore, it fails absolutely to explain the post-nasal ozena, which, nevertheless, ought to enter into consideration. Considering it unnecessary to bear in mind the sinus theories often advanced, for ozena is much more frequent than sinus trouble, Prof. Lavrand affirms that a single case of ozena is sufficient to invalidate such a theory. But this argument reacts in precisely the same way against his, and is perhaps the best that can be advanced in opposition to his own theory. Besides, the written testimony of my patient proves that, without directly treating the nose, and even without curetting the ethmoids, he was able by conforming to the general instructions which I prescribed for him to get his ozena under control. My opinions then have practically outweighed all those of my confreres who never bothered with anything but the local condition.

Believers in contagion would be wrong to rely upon the fact of the co-existence of ozena in the brother and in the sister to affirm the correctness of the theory which they support. The same cause: physiological distress, has simply, in this case once again, brought about identical effects. Thus it is, ordinarily, with the remainder.

In order to remain within the bounds of my subject matter, I must refrain from developing considerations relative to enuresis and aprosexia. I must be contented to recall,* as I have said before,

*Respiration and Incontinence of Urine (Bulletin Officiel des Sociétés Médicales d'arrondissements de Paris, 20 Juillet, 1903).

Nasal Aprosexia and Respiratory Gymnastics (Association Francaise pour l'Avancement des Sciences). Congrès de Toulouse, Août, 1910.

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that all these phenomena arise from a similar source. I shall sum up my position as follows:

Ozena is not an idiopathic disease nor an affection "sui generis." It is purely an atrophic manifestation, with secretory changes, indicating a disorder, deep-rooted and commonly of long standing, of the general health, in turn having originated through a variety of causes.

With common sense and with patience, through a careful investigation of the pathological history of the patient, the origin, sometimes near, often distant, can, in fact almost always, be discovered, and the connecting link between the successive stages, which have their end in ozena, can be attained.

Frequent in infancy, yet more common in adolescence, the disease is very far from being exceptional in the adult. Inherited predispositions, unfavorable environment, varied pathological accidents, by diminishing the organic resistance of the individual, prepare a soil favorable to the future appearance of ozena. Theoretically and because it is due to a general cause, ozena can appear at all points upon the respiratory mucosa. The fact that it occurs most frequently at the top of the nasal fossa is, of course, explainable both by reason of its topographical and physiological anatomy.

The theory of the contagion of ozena rests upon an error in the interpretation. The appearance of analogous symptoms is due to the similarity of the soil and not to infection. The same applies to the ethmoidal theory.

The influence of the respiratory changes is the first in the order of occurrence; yet these changes themselves are, in a general way, dominated over by any serious disorders with the general economy.

These etiological considerations, satisfying to the reason, are also a guide to the application of therapeutics. They account for the continued failures brought on by treatment at random as varied as injudicious.

From all this emerges a lesson for the specialist. His authority, like that of all other doctors, ought to have no value except as it is solidly based on wide general knowledge. That is to say, he ought to be capable, in a general view of the whole, of grasping

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the continuity of symptoms, of explaining causes, and of understanding the evolution of the affections upon which he is called to formulate a judgment.

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THE RELATION OF ENLARGED TONSILS TO ENDOCARDITIS.

BY ALBERT C. GETCHELL, M.D.

In the Transactions of the Association of American Physicians for the year 1899 is a paper on Endocarditis occurring in the Course of Tonsillitis, by Dr. F. A. Packard. While the writer was guarded as to his conclusions, yet the paper stands as a definite exposition of the relationship of tonsillitis and endocarditis, and has been so quoted by other writers from time to time. The question Dr. Packard discussed was a pathological one, but with the growth of the operation for the complete removal of the tonsil it has become also a practical one. For if so serious a malady as endocarditis depends to any considerable degree upon the presence in tonsils of a causative agent, any operation, however difficult or dangerous, is not only proper but necessary.

There is no question that among throat specialists in the United States there has of late years been a growing feeling of the importance of the tonsils as the portals of entry for the infection of many serious diseases, and one finds this idea gaining ground among the profession at large.

Looking over the literature of the subject among writers on Diseases of the Heart and Diseases of Children, I find this view rather cautiously stated by some, while others make no mention of it whatever. Thus, not to attempt an exhaustive list, but by way of illustration, Whittaker in The Twentieth Century of Practice, 1895, vol. IV., p. 156, says: "The tendency of modern belief is to regard the throat as the avenue of entrance for the micro-organisms of rheumatism and endocarditis." Haig-Brown found conclusive evidence of endocarditis in eight out of 345 cases of tonsillitis. These and other quotations may be found in Packard's article. Babcock in his book on the heart, p. 156, says: "It (endocarditis) has been known to follow tonsillitis, and so apparently a local process as furuncle." Holt

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says (edition of 1910, p. 1144): "Acute tonsillitis often ushers in an attack of rheumatic arthritis, and occasionally acute endocarditis."

The most recent book on diseases of the heart that I have consulted, James Mackenzie, makes no mention of the matter. And also Edmund Cautley, in his Diseases of Infants and Children, just published, makes no mention of the relationship.

On the other hand, Osler, in the article on Endocarditis which he writes in his recent system of medicine, speaks in no uncertain terms. He says (vol. IV., p. 138):

"The tonsils, the mycotic hotbeds, are responsible for a great many cases, and if, as is now commonly believed, the infection of acute rheumatic fever is here nurtured, they take the first rank as sources of infection."

Again, page 139:

"The so-called endocarditis from cold is probably always rheumatic, and of tonsilar origin, and it may occur in the febrile attacks of children as the result of slight or even overlooked tonsillitis."

And again, page 149:

"Much could be done to lessen the number of cases of rheumatic fever, of chorea, and of endocarditis, if we attacked more vigorously and more systematically the enlarged tonsils of children. Here is the point toward which our efforts should be directed. A child subject to recurring attacks of tonsillitis or with marked adenoids should have the tonsils or adenoids thoroughly removed. Other measures of local treatment simply trifle with what is always a very dangerous condition."

Here the question with which this inquiry started is answered positively, almost dogmatically, by an eminent authority. The tonsils of a child subject to recurring attacks of tonsillitis are dangerous structures, whose complete and thorough removal is demanded to save the child from so serious a disease as endocarditis. It seems to me, however, that even this does not settle the question, but that further study of the problem is needed. I used to think that the relation of tonsillitis, or rather, to be more

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specific, the relation of chronically enlarged tonsils to endocarditis was a very definite one. For the last four or five years, however, I have been studying more carefully the cases of enlarged tonsils and adenoids that have come to me for operation, and I do not feel that the causative relation is so definite as I once did.

I have had continuous charge of the throat department at the Memorial Hospital in Worcester for nineteen years. In that time there have been somewhat over 2,000 tonsil operations. Until recently I have done all the operating myself. For the last few years my assistants have done a good deal, but I still exercise close supervision over the work, operating myself one day in the week. For safety of anaesthesia it has always been our custom to examine with bare chest the heart and lungs of patients before operation, and if the house physician finds anything abnormal the matter is brought to the attention of the operating surgeon. These cases include boys and girls up to the age of sixteen and adult women. Since I have begun to pay especial attention to the matter, I have been struck with the extreme rarity of heart lesions.

I can recall but one case of undoubted cardiac disease. Of this case I shall speak later. And so of all the cases that have come under my observation in this hospital, in private practice and in other hospitals, while I have found definite cardiac lesions in persons who came for the removal of enlarged tonsils, yet these cases are so few that the complication in my experience is one of great rarity. If, then, enlarged tonsils, which have been subject to recurring attacks of inflammation are so definite a cause of endocarditis, why should evidence of endocardial trouble in these patients be not only not the rule but the rare exception?

I desire now to cite the case I referred to a few moments ago. It was a boy of fourteen, with well-marked heart disease—enlargement, thrill, apex systolic murmur transmitted to the axilla and heard plainly in the back. He had very large tonsils, and was referred to me for removal of them on account of his heart trouble. At first sight it seemed to be a case where there was a direct relation between enlarged tonsils as such and endocarditis, and so the doctor thought who referred the case. On careful

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inquiry, however, I found that this was not so. This boy, so far as he and his mother knew, had never had sore throat, and up to two years ago was always well. Then he was ill with diphtheria, and was at the Isolation Hospital. Since then he has not been so well, and has had to call a doctor from time to time. When he was at Isolation Hospital no note was made of any heart trouble. It is hardly possible that a heart like his could have escaped detection in this well-conducted hospital. It is, therefore, plain that his endocardial trouble developed after his diphtheria, and probably as a result of it. His tonsils were removed and examined by a pathologist. They were simply hypertrophied tonsils.

Before much can be gained in settlement of this question, we must have definite ideas of what we mean by endocarditis. Is the pathological process limited to the lining membrane of the heart, or does it involve to a greater or less extent the heart muscle? If the former, the lesion is much more serious than the latter, for the mechanism of the heart is permanently damaged by alteration in the structure of the valves. On the other hand, if the lesion which causes the murmur is due to myocardial change and dilatation of the orifices, this condition may be temporary and the heart later recover its perfect power.

Osler says (op. at p. 134): "Infective endocarditis is a valvular, rarely a mural lesion." But later on (p. 136): "In addition to changes in the endocardium there are usually alterations in the myocardium," and (p. 145) "Sturgis very correctly insisted that a majority of the cases are best described as carditis, so frequently are the epicardium and the substance of the heart involved."

Mackenzie (p. 215) says: "One must consider carefully the murmurs arising in the course of a febrile attack, even in rheumatic fever, for the presence of a murmur may not necessarily mean the invasion of the mitral valves by the inflammatory process, but may be due to the tonicity of the poisoned heart muscle failing and giving rise to incompetence of the mitral orifice, due therefore not to endocardial but to a myocardial affection. Endocarditis and pericarditis both acute and chronic, bulk so largely in medical literature, only because an abnormal sound

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invariably impresses the mind more than an abnormal sign perceptible by other senses, and the easy recognition of a valvular murmur and friction sound has led to the associated symptoms being ascribed to the same lesion."

(See also Thayer "On the Commoner Types of Functional Cardiac Murmurs"—Trans. of the Association of American Physicians, vol. XXV., p. 75.)

Will not these considerations account for the fact that if children are carefully examined a murmur may be found and a diagnosis of endocarditis made, while later in life this same person may apply for removal of the tonsils and no cardiac lesion be found? This may happen peculiarly in children, in whom a cardiac abnormality may develop without being accompanied by evident symptoms.

This is a case in point: A young girl upon whom I operated last Summer for the removal of tonsils. About once a year she had had attacks of tonsillitis. Her parents were people who never hesitated to call the family physician, a careful and competent man. A cardiac murmur was accidentally found in the examination of the gymnasium physician, its existence or heart trouble not having been suspected.

Tonsillitis is common in childhood. Osler says: "Tonsillar infection is universal in childhood." Is acute endocarditis proportionally common then? Gibson, Diseases of the Heart and Aorta, 1898, page 393, says: "Acute endocarditis is essentially a disease of the active period of adult life, its occurance being most frequent between the age of twenty and forty." To finish Osler's remark just quoted: "Tonsillar infection is universal in childhood while rheumatic infection, although common, only occurs in a comparatively small number of children" (page 139). Julius Derschfeld says (Allbult's System, vol. I., p. 630): "Infective endocarditis occurs between twenty and forty. It is rare in children, according to Osler, although he (Derschfeld) thinks it is not so rare."

The diseases which are supposed to cause endocarditis are scarlet fever, measles, small-pox, influenza, erysipelas, pneumonia, pyaemia, gonorrhœa, tuberculosis, rheumatism, otitis, diseases of the vagina and uterus, empyaemia (Gibson).

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Researches demonstrate conclusively the invasion of the heart by the specific organism of rheumatic fever, pneumonia, typhoid fever, diphtheria, erysipelas, influenza and various septic infections. (Mackenzie, page 214).

Whittaker (20th Century of Practice, page 156) gives in addition to those already mentioned osteomyelitis and periostitis, furunculosis, dysentery, malaria, and says: "It is universally admitted that even the most trivial infection may be followed by endocarditis. Thus endocarditis has been observed after infections as inconsiderable as quinsy and mumps." That is to say, many, probably all the general diseases which are due to a micro-organism may produce heart disease. Of these, rheumatism, in all probability a germ disease, is more liable to cause heart infection, which locates on the valves. It is true also that other infections, more likely to be local than general, may produce the same result, such as septic infections. The mouth, being the opening of the body most accessible, it seems that the point of entrance of the infecting agent would be there, and it is undoubtedly true that it is in many instances. Moreover, if the structures in the mouth are inflamed or diseased, resistance is lowered and infection is more liable to take place. In this way chronically enlarged and inflamed tonsils would, and undoubtedly do, make the throat more liable to infection. But it does not follow that the tonsils themselves are the necessary and sole foci of infection. Thus, a careful reading of Packard's five cases shows that in only one of them were there swollen and inflamed tonsils, that is a typically acute tonsillitis. One of the cases had a slightly inflamed tonsil with an enlarged cervical lymph node of the same side. The second had a mild angina with catarrhal inflammation of the pharynx. The third had greatly enlarged and acutely inflamed tonsils. The fourth had pain in swallowing, and on examination the mucous membrane of the fauces and pharynx was found to be swollen and reddened, and the submaxillary lymph-nodes were plainly enlarged. The fifth had a slight sore throat, and Dr. Packard's services were called because of a glandular swelling on the neck a few days later. I quote these cases thus fully because this

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paper has been so often referred to. It is evident that there was in all these cases an infection of the throat, but it is not evident that the tonsils were in all of them either the cause or the avenue of the infection.

Sore throats, anginas as they used to be called, even in children are not all due to inflammation of the tonsils. They are very often due to an inflammation of the glandular tissue of the pharynx, even an infection with a deposit simulating diphtheria starting here.

I have under observation now an adult, a nurse in a hospital, whose tonsils I removed, with the main intent to put a stop to infective sore throats. The tonsils were thoroughly removed, but she has had the sore throats which excite suspicion of diphtheria as she did before, and she tells me of a friend who has a similar experience.

In adults a not uncommon cause of a sore throat is an inflammation of the lateral columns of the pharynx. The pain and other symptoms in this variety of sore throat simulate tonsillitis, and might very well be called tonsillitis by practitioners not accustomed to carefully inspect the throat with a good light. So that we should be cautious in concluding from the mere fact of sequence of sore throat and endocardial symptoms that the initial disease was tonsillitis. But, if in a certain number of cases the sore throat is due to tonsillitis, and endocarditis follows this sore throat, the question still remains, were the tonsils the accidental or the essential foci of infection.

The question here is not, does endocarditis follow in a considerable number of cases attacks of tonsillitis, especially in persons who have rheumatism, which clinically seems well established; but does the enlarged tonsil, by and of itself, contain the infecting agent likely to produce the disease? If this is so, endocarditis associated with enlarged tonsils should occur most frequently in the period of life when tonsillar inflammation is most common, which it does not, and persons having enlarged tonsils should show not rarely, but frequently, signs of endocarditis, which in my experience is not true.

An answer to this question should be found in the study of the bacteria of infective endocarditis and of the bacteria of the

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tonsils. It would seem from the studies of Libman and Celler (Observations on the Etiology of Subacute Infective Endocarditis. Trans. of Assn. of Amer. Physicians, vol. 25, p. 5), that we are getting to a definite knowledge on this subject. The next step will be to study the bacteria of the tonsils, and see if they correspond to those found in the cardiac lesions, and if they be made to produce endocarditis experimentally. This Dr. David J. Davis, of Chicago, has done. He has reported upon this work in a short communication in the Journal of the American Medical Association for July 2, 1910, page 26. This report and a personal letter from him indicate that our knowledge of the bacteriology of the tonsils is very imperfect and inadequate; that the whole subject must be gone over again and newer methods employed. He finds his own work far from conclusive, and at present states only facts, refraining from any general conclusion. He finds that the bacteria of the crypts are of one kind, and those of the surface another. The bacteria of the crypts injected into rabbits intravenously almost invariably localized in the joints and tendon sheaths, but they in no case produced endocarditis. On the other hand, in one instance he succeeded in producing endocarditis with an injection of the surface bacteria. These bacteria, he cautiously concludes, are the same that have been found in the blood in cases of chronic infective endocarditis by Rosenow and others.

To make a general statement, so far as one can be made at this time, the tonsils, lying as they do in the outer portals or vestibule of the digestive and respiratory tracts, are organs upon which certain bacteria lodge, and the infection of the tonsils with the bacteria causes an inflammation of the tonsils, and later within the system these same bacteria may cause an inflammation of the heart. Hence the sequence in time of tonsillitis or endocarditis. But the tonsils are the accidental and not the essential agents in this infection.

Early in this paper I said that its object is a practical one. It is this: So far as enlarged tonsils have a relation to endocarditis, when is the operation for their removal indicated, and what kind of an operation should be done? Before answering this question it may be well to review briefly the present status

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of opinion on these two points in reference to the general question of tonsil operations.

In a recent paper by Guy L. Hunner, M. D., on Chronic Urethritis and Chronic Uteritis Caused by Tonsillitis (Journal of the Am. M. A., April 1, 1911, p. 937) the following paragraph may be found:

"In a comparatively recent paper Rosenheimer has reviewed the literature and found the following list of ailments ascribed in certain cases to tonsillar infection: Aneurysm, appendicitis, erysipelas, and a number of other skin manifestations, meningitis, iritis, pleuritis, pericarditis, pneumonia, paraplegia and strabismus, parotitis, nephritis, osteomyelitis, phlegmon of the lower extremities, oophoritis and orchitis, septicemia, typhoid beginning with an angina, and tuberculosis."

We are told by reputable men that at the base of innocent looking tonsils lie foci of disease, and that every particle of tonsillar tissue should be removed to prevent serious systemic disease.

The character and type of operation generally practiced now may be inferred from the instruments used. I counted in a recent instrument catalogue sixty-four varieties of tonsil knives, many sharp and pointed.

At one of our best medical schools recently I saw a child brought before the class for operation. The child was profoundly etherized and put in the upright position, and the instructor told the class that the present method of operation required the complete etherization, and that nothing else would do. The tonsils were then removed by the dissection method.

In a recent paper (Boston Medical and Surgical Journal, vol. 164, No. 12, p. 415) Dr. E. A. Crockett says: "Twelve deaths have occurred in and about Boston in the last two years following upon the removal of tonsils, besides a large number of considerable hemorrhages that would have been fatal unless checked by experienced hands."

Is it not time to pause and ask if the operation for the removal of tonsils as at present practiced is necessary, and if this toll of mortality is justified?

So far as endocarditis is concerned, I am convinced that a

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simply hypertrophied tonsil has little to do with it as a causative factor; that when it happens to have been inflamed before the onset of endocarditis, the infection has been on the surface of the tonsil and has not started deep in the substance of the organ, and that the removal of the tonsil has little effect on the incidence or recurrence of the disease, except, if it be subject to recurring attacks of inflammation, it in so far makes the tissues about the pharynx, including the tonsil itself, more susceptible to infection.

It is beyond the province of this paper to discuss the relation of the tonsil to other diseases. But I infer it is the same. An uninflamed simply hypertrophied tonsil has slight causal relation to systemic diseases. An inflamed and diseased tonsil may have such relation, and undoubtedly does in a limited number of cases.

The indications for removal, so far as this question is concerned then, are, is the tonsil subject to recurring attacks of inflammation, or is it evidently diseased? If the tonsil is simply hypertrophied, such removal, either in whole or in part, as will prevent future attacks of inflammation is sufficient. If it is evidently diseased, and especially if buried and bound down by inflammatory tissue, it must be thoroughly dissected out.

In my experience an operation with the tonsillotome is adequate for the first class. The instrument I have used now many years is a modification of the Mackenzie tonsillotome. Since the operation for the complete removal of tonsils has been practiced, I have slightly modified my method of operating, and have found that a complete removal can be accomplished by this instrument.

This operation, in experienced hands, in most cases, removes the tonsil as thoroughly as it can be removed by any operation, and in my opinion is as safe as a tonsil operation can be. In inexperienced hands, while the operation may not be as complete, the risks of serious accidents are slight. The operation for the removal of tonsils of the second class by dissection methods is a difficult one, and in inexperienced hands a dangerous one. It should be undertaken only by operators of mature experience and skill, and as Dr. Crockett has truly said, by those able and ready to meet dangerous complications that may arise.

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PRIMARY CHANCRE OF THE TONSIL.

BY A. B. THRASHER, M.D.

I have long been impressed with the idea that members of the medical profession at large have made many serious mistakes by regarding syphilis as only a venereal disease. Dr. Delevan has said before this society that the sooner the profession recognizes that syphilis is not merely a venereal disease the better for all.

Dr. Griffin (Amer. Jour. Dermatology, 1906) even goes so far as to say that syphilis is no more a venereal disease than is tuberculosis, and especially can this be said of the primary disease of lips, the tongue or fauces.

Not long since in reporting some cases of chancre of the lips and fauces I was convinced that many cases are overlooked because of the innocence of the patient. Certainly not all sore tonsils are seen by expert specialists. How many cases of chancre of the tonsil have been unrecognized until general symptoms were present and then the initial lesion had disappeared and been forgotten will never be known.

While this paper may not present anything new to you, it may serve to remind you that primary infection of the tonsil occurs, and in many cases it is recognized either with difficulty, or not at all.

Primary syphilis of the tonsil was first described by Ricord in 1838. Since then numerous cases have been reported, although many practitioners of large experience have never seen a case. Rollet, in 1859, reported four cases of tonsillar chancre in one family. The first detailed report of such cases, however, was made by Diday in 1861. Of 198 extragenital primary affections, according to Pospelow, forty-six were tonsillar. There is a very great diversity of opinion as to the relative frequency of tonsillar affection by different observers. This difference varies from 1% to 75% of extragenital chancres on the tonsil. Rosenquist reports as treated in the Hospital of

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Mjassnitski, Moscow, 354 extragenital primary affections, 179, or 55.6%, of which were tonsillar.

Stiebel reported fifty cases of extragenital initial lesions treated in the Joseph Policlinic, of which three, or 6%, were tonsillar. Duncan Bulkley, according to Hellwig, has compiled statistics from many countries of the relative frequency of tonsillar chancre compared with other extragenital initial lesions. These varied from 1.4% in Germany and Holland, 3% in the United States, 5% in France and Belgium, to 19% in Denmark, Sweden and Norway.

Morell Lavallee observed in Fournier's Clinic in one year forty-five extragenital primary lesions, only one of which was tonsillar.

This very wide variation in observation of the comparative frequency of tonsillar chancre would indicate that it is a rather rare condition. When we consider the number that must have been overlooked, or not recognized, perhaps about 20% of all extragenital chancre are tonsillar. If, however, we confine ourselves to considering only initial lesions of the pharynx, then we find that nearly all of them are on the tonsil.

Hopman reports 428 lesions of the tonsils out of 509 pharyngeal infections. Sandziak found 16% of tonsillar scleroses among 3,767 of the lips, mouth, pharynx, nose and ears.

Sabolotzky, in the Mjassnitzki Hospital, reports 139 cases of extragenital syphilitic infection in one year, of which 104, or nearly 75%, were tonsillar.

Neumann, of Vienna, reports that among 4,634 luetic patients visiting his clinic from 1880-1901, 207 had primary extragenital infection, and of these twenty were tonsillar lesions.

Sabolotzky regards the tonsil as first in frequency of infection among extragenital lesions; Senziak gives it the second place, Pospelow the third, while according to Muenchheimer, who has published statistics of a very large number of extragenital infections, that of the tonsil ranks fifth in frequency.

On the other hand, Gay observed only two cases of primary tonsillar infections in twenty-four years, and Protzeck, at the Breslau Clinic, saw but one case among ninety-three extragenital chancre in twelve years.

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Acording to French authors, the male sex is more frequently affected than the female. Among the Germans and Russians the female is more frequently affected. Pospelow says that aside from coitus per os, woman as a mother, nurse, cook or servant is more exposed to infection than man. Kaesbohrer says that different customs in different countries may account for the difference in affections of the two sexes.

By far the most frequent cause of tonsillar infection is the virus conveyed by kissing. In the four cases coming under my notice three were contracted in this way. Mucous patches on the lips or on the tongue would easily introduce the contagion into the mouth, where it would readily lodge in the tonsil. Especially is this danger present where kissing is accompanied by the introduction of the tongue in intensive, passionate osculation. By this means the virus can readily be conveyed to innocent persons with no thought of danger by either party. In the fourth of my cases the virus was coughed into the face of the physician who was treating a patient for luetic sore throat, a tonsillar chancre being the result. One case is reported of a physician who attempted to resuscitate a newly born asphyxiated luetic child by applying his mouth directly to that of the child and attempting to thus inflate the lungs. A tonsillar chancre followed in due order.

Perverse sexual intercourse, coitus per os, is often given as a cause. Dr. Max Thorner gave this as the acknowledged cause of infection in a case he reported to the Cincinnati Academy of Medicine. Kaesbohrer, however, found this to be a rare method of infection, and he was able to trace only seven cases to bestial practice. Bruhns (Berliner Klinische Wochenschrift, 1900) says that only rarely is hard chancre of the tonsil acquired by pervert coition, the usual method being from kissing or from eating or drinking utensils. Infection has been attributed not only to imperfectly cleansed eating and drinking vessels and utensils, but to pipes, cigars (the cigarmaker moistening the end of the wrapper with luetic saliva), leadpencils (from the common habit of placing the end of the pencil in the mouth), nails, glass blower's blowpipe, toothbrush—even one case from the use of a syphilitic relative's tooth powder—rubber nipples,

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a child from the nipple of a luetic nurse. The infection has been attributed to imperfectly sterilized instruments, as a tonsillotome or eustachian catheter.

The first symptoms of primary syphilitic infection of the tonsil are exceedingly insiduous. A sensation of first irritation and then pain is usually what directs the patient's attention to his throat. Slowly the throat grows worse until there is pain on deglutition, radiating toward the ear of the affected side. There is generally no marked rise in temperature, although in mixed infection there may be chills, fever and general feeling of illness. When the physician is consulted there is usually seen a swollen red tonsil, on which is a gray ulcer surrounded by a zone of indurated tissues. At times there is no ulceration, only a hard swollen tonsil. The cervical lymphatic glands are found to be involved. Of these the submaxillary are the most frequently affected; then the other anterior cervical glands and finally the mastoid and posterior cervical glands become enlarged. These enlarged glands are usually indolent, although occasionally they become painful and finally fluctuate and even suppurate, acting quite like the inguianal glands in chancre of the penis. As a rule the affection involves but one tonsil when the unilateral swelling of the tonsil and faucial pillars present a characteristic picture. The tonsil is red, swollen, more or less ulcerated, firm or hard to the touch and usually quite sensitive to any manipulation. The ulcerated area is covered with a dirty grayish secretion and is surrounded by, and superimposed upon, a mass of sclerotic tissue. The inflammation may be so severe as to cause a great destruction of tonsillar tissue, like that for example produced by a cancerous growth. When the tonsil is primarily infected the constitutional or so-called secondary manifestations appear earlier than usual. So certainly is this true that the physician who is first consulted for the sore tonsil can, as a rule, find secondary lesions already present. So not infrequently can the examining surgeon thus early confirm his diagnosis by macroscopical inspection. If no constitutional symptoms are present then the microscope may detect the spirochete, or the serum reaction may be positive. Where, however, the affection is strictly confined to the tonsil the sero-

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diagnostic test is uncertain (Gaston & Girauld. Bulletin Soc. fr. de dermat, et de Syph, 1908.).

Differential diagnosis may at times present difficulties. In acute tonsillitis we would have more rapid rise in the inflammatory symptoms, more fever, a more extensive involvement of the faucial tissues, numerous small glands suppurating and general symptoms of an acute rather than a chronic disease. The rapid course of the simple acute pharyngitis would soon decide the diagnosis.

The grayish membrane is somewhat like the diphtheritic membrane in appearance. But in diphtheria there are the marked constitutional symptoms with a rapid growth of the membrane over different parts of the throat, not being confined to one tonsil. It is true that the involvement of the cervical glands which is absent in simple pharyngitis is present in diphtheria, yet not to the same extent as in syphilis. Diphtheria attacks the mucous membrane of the entire throat, where the chancre is generally unilateral.

A broken down gumma may be mistaken for a hard chancre. In the gumma, however, we do not have so much pain, neither is there the red, tense mucous membrane over the tonsil. Then with the gumma we do not find the marked cervical adenitis present with the chancre, neither do we have pain in deglutition, or on pressure. From secondary syphilis the difference is more marked. Here we generally have bilatteral lesions, and if a phagedenic ulcer is present on the tonsil the base is not so much indurated nor are the submaxillary or cervical glands so much affected.

In tuberculosis other symptoms are usually found. The surrounding mucosa is pale and cough is distressing. In cases of doubt the microscope will quickly differentiate.

When, however, there is a mixed infection of both syphilis and tubercle mistakes in diagnosis are frequent. Then the microscope may reveal both infections on the same slide. The entire body must be inspected, and even then the outcome of treatment may be acquired to clear or make sure the diagnosis.

Cancer of the tonsil is probably more nearly simulated by hard chancre than any other affection. The age of the patient

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is usually an important diagnostic point. Cancer progresses more slowly, bleeds more readily, is not so painful on manipulation. Time and the results of treatment settle the diagnosis.

Sarcoma is more apt to be confused with a gumma, as a very short time would differentiate from a chancre.

The course of a primary syphilitic affection of the tonsil is more rapid than in other parts. Before the general infection of course the serum test would be without value. So rapid, however, is the spread of the disease that rarely does a patient consult a physician for the sore throat before symptoms of constitutional infection can be found.

There are some points in treatment that we as specialists may be called on to decide. If seen early, before any constitutional symptoms are manifest, it appears to me that the patient should be given the benefit of a radical tonsillectomy. Every precaution should be taken to prevent infection of the raw surface, both before and after the operation. In my judgment there is a chance for the complete removal of the contagion by an early and thorough operation.

Of course, if all tonsils were thoroughly removed from children this course of infection would not exist. The next best thing would be immediate tonsillectomy in such cases as are seen before the serum test indicated a general spread of the disease.

Aside from the surgical treatment other remedies, such as mercury and arsenic, would be employed not differently from their use in other primary lesions.

Discussion on the Paper of Dr. A. B. Thrasher.

Dr. Algernon Coolidge, Jr.: In reference to Dr. Thrasher's paper I have recently seen a case of chancre of the tonsil where "606" was given just as the secondary symptoms began to appear. The whole process stopped in a most remarkable way.

As to the perennial question whether certain tonsils should be condemned, it is often assumed that we can tell the guilty from the innocent by sight, which is not true. With all suspected criminals the question of what they have done is more important than their appearance, the important thing to consider is the evidence of wrong doing. It is proper in surgery to con-

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vict on reasonable suspicion, but if all deposit in tonsillar crypts, and all departures from normal shape are called disease, much unnecessary operating will be done. It may be better that many innocent tonsils should perish than that one guilty one should escape, but it is also true that every unnecessary operation does a little harm to medical science.

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RELATION OF THE TONSIL OPERATION TO THE SOFT PALATE AND VOICE.

BY G. HUDSON MAKUEN, M.D.

There is a popular and widespread belief, both within and without the profession, that the removal of the tonsils in some mysterious way results in an impairment of the voice, and it is my purpose in this paper to discuss the causes which lead to this belief, and if possible to arrive at some conclusions which may be justified by the facts.

In the first place, it may be well to state that there is no absolute standard of vocal excellence, and the voice that sounds good to one person may sound very different to another. In other words, as to whether a voice is good or bad depends, not actually but practically, upon the ear of the listener, and probably no voice sounds altogether good except to the ear of the one who is responsible for it. This fact may account, perhaps, for the great difference of opinion now prevailing as to the effect of tonsil operations upon the voice.

The questions for consideration are: (1) Has the normal tonsil any function in voice production? (2) Is the abnormal tonsil prejudicial to voice production? and (3) Does the removal of abnormal tonsils necessarily injure the voice?

The three important vocal organs affected by the tonsils are the soft palate, the tongue and the larynx.

The soft palate is especially affected by the tonsils, and it is one of the most important of the phonatory organs, because upon its normal action the normal action of all the others depends. The soft palate resembles both the tongue and the larynx in respect to its motility. These three important phonatory organs are not fixed with reference to their adjacent bony structures, but they are freely movable, and they are so interconnected by their complicated muscular structures that the action of one is greatly influenced by the action of the other two, and especially

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is it quite impossible for the larynx to perform its function in artistic vocalization when the functions of the tongue and palate are at all interfered with by any obstructions whatsoever.

The soft palate resembles the tongue in other respects. Indeed, it may be regarded as a kind of second or supplementary tongue, having its base in the aponeurosis attached to the posterior border of the hard palate, pointing backward and downward, and ending in the uvula, which forms the tip of this palatal tongue.

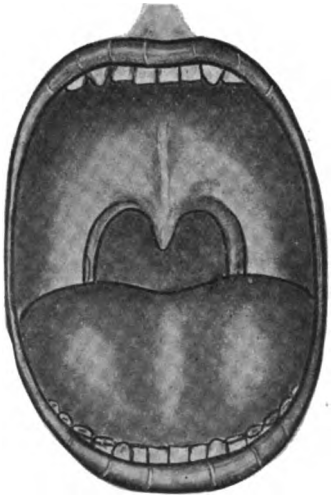

Fig. 1.

Normal palate in complete relaxation, with deep fossae, and normal tonsils slightly protruding behind the edges of the anterior pillars.

The soft palate has two important functions in phonation, one being a valvular function by which vocal resonance is markedly affected, and the other has been called a thyroid tilting and cord stretching function by which the quality and pitch of the voice are determined and regulated.

The palatal tongue, as I have called it, is suspended in the oropharynx chiefly by means of four pairs of muscles, two of them holding it up, and by their contraction tending to pull it upward and backward; and two of them resisting this upward

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movement, and when in contraction tending to pull it downward. It is a well-established fact that the palatal valve is closed during the production of many important vocal sounds, and the nasal cavities are thus shut off from the oropharynx. The closure of the valve is brought about chiefly by a contraction of the levator-palati muscles and a straightening of the depressor-palati muscles, namely, the palato-glossi and the palato-pharyngii muscles. This valvular action of the soft palate may be greatly interfered with by abnormally large or degenerate faucial tonsils, the large tonsils interfering with the motility of the depressor muscles, and the degenerate having somewhat the same effect by the catarrhal hypertrophies and adhesions which they engender. As is frequently the case when these conditions are particularly marked, the palatal valve fails to close, leaving the oropharynx in free communication with the nasal cavities, and giving to the voice its characteristic faulty resonance. In addition to this, of course, when the valve fails to close and the soft palate hangs limp in the oropharynx, the palato-pharyngii muscles, having lost their anchorage in the vault, are quite unable to perform their thyroid tilting and cord stretching function, and the voice necessarily suffers as a consequence both in respect to quality and to pitch.

Clinically, the tonsils may be divided into two classes, the normal and the abnormal class.

It will be admitted, I suppose, by the most radical operators that we do occasionally meet with a normal tonsil, or at least—and you see I am disposed to qualify even this statement—a tonsil which approximates the normal and which no one would think of removing. The question arises, therefore, has this normal tonsil any function in phonation, or does its presence affect this physiological process favorably or unfavorably?

There are three ways in which the normal tonsil may affect phonation: (1) Through the action of the muscles; (2) through the principle of resonance, and (3) as a source of lubrication for the vocal organs.

The normal faucial tonsil varies both in shape and size, and it somewhat resembles a small almond, its long diameter being parallel with the long axis of the neck. Such a small and yield-

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ing body can scarcely be regarded as having much effect upon the important muscles of phonation immediately surrounding it, except, perhaps, that it serves to keep the faucial pillars apart, and thus determines to some extent the direction of their forces in the act of phonation. The effect, therefore, of the normal tonsil upon the valvular action of the palate should be beneficial rather than otherwise, and the resultant vocal resonance should be correspondingly improved. Furthermore, as to the question of resonance, we know that the attachment to mechan-

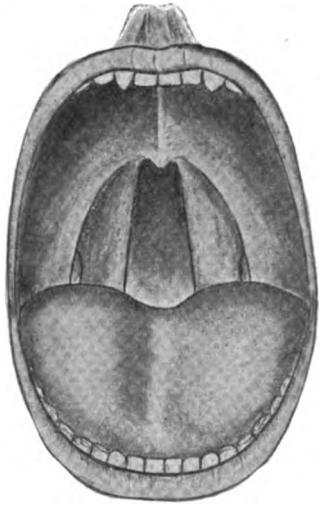

Fig. 2.

Same palate as in Fig. 1, with levator muscles in contraction and the palato-pharyngei muscles in position to perform their cord stretching function.

ical instruments of even small bodies of a different density from these instruments produces marked changes in their resonance qualities, and although the density of the tonsillar mass may not differ much from that of the muscular walls of the oral cavity, yet, during the act of phonation, when the muscles are often tense and hard, the difference is much increased. On the other hand, the normal tonsillar mass in its partially atrophied condition, as found in the adult fauces, is presumably of greater density than the active and somewhat larger gland found in

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children, and, therefore, the character of its structure is more nearly that of the surrounding muscles during phonation, and its effect upon the resonance of the voice would be correspondingly less. Notwithstanding this fact, and reasoning from analogy, I think we may conclude that the resonance of the oral cavity must be somewhat affected by the existence of these glands, and that it must be affected in a manner favorable to phonation should be taken for granted until the contrary has been proved. As to whether the voice would be unfavorably affected, however, by the removal of normal tonsils is a question which could be determined only by taking careful phonatory records before and after many experimental operations in normal throats, a thing, of course, which one would hardly think of doing.

There are two types of abnormal tonsils—the simple hypertrophied and the degenerate type.

The simple hypertrophied tonsil differs from the normal tonsil chiefly in respect to its size, and although it is probably the least prejudicial to health of all abnormal tonsils, it is distinctly prejudicial to phonation, because it interferes with the valvular action of the soft palate, thus, as we have shown, impairing directly the resonance of the voice, and indirectly its quality and pitch. The muscles surrounding the hypertrophied tonsil are crowded out of their normal position, and therefore they lack precision of action, and the resonance of the voice is impaired in proportion to the size of the tonsillar mass, and its interference with the valvular action of the palate.

The muscles forming the pillars of the palate instead of being quite straight in their vertical planes of action are bowed, the one anteriorly and the other posteriorly, to a degree corresponding to the size of the tonsil, and even moderately large tonsils sometimes so displace these muscles and limit their action as to keep the soft palate from rising, thus entirely preventing the performance of its valvular function during phonation, and as a result there remains an open channel from the oral cavity into the nostrils, giving undue nasality to the voice. Not only so, but the pressure upon these depressor muscles of the palate and their resultant sluggish action serve to put all the muscles of the

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palate in a more or less paretic condition, and we have the so-called relaxed palate, the result of which is always more or less evident in the strongly muffled character of the voice, and in its limited range of pitch, for owing to the laryngeal functions of the palato-pharyngii muscles, to which reference has been made, the quality and pitch of the voice cannot be controlled with any degree of accuracy when the soft palate is relaxed.

The mouth breathing accompanying hypertrophied tonsils, more frequently perhaps as a cause than as a result, adds greatly

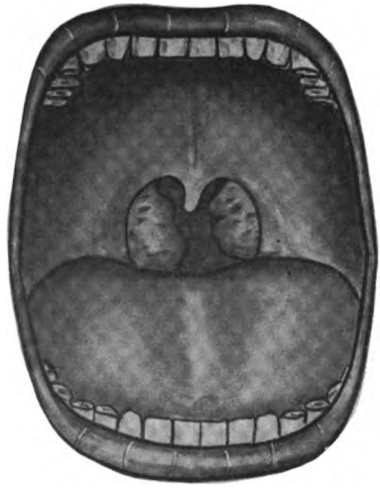

Fig. 3.

Large obstructive tonsils obscuring the posterior pillars and interfering with their thyroid tilting and cord stretching function.

to the phonatory disability on account of its effect upon the muscles of the soft palate and the tongue. The open mouth often depends either upon malocclusion of the teeth or upon some form of intranasal or postnasal obstruction, or upon all these conditions combined, and therefore, as has been suggested, the tonsillar hypertrophy may be largely of a compensatory nature. If this theory is the correct one, operative procedures should begin with the regulation of the teeth and the removal of intranasal and postnasal obstructions. In other words, the

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closing of the mouth should be made possible, the respiratory channel freed, and the tonsils given a chance to return to their normal state. If, however, the tonsillar enlargement proves to be a true hypertrophy, without degeneration, and Nature seems to be unequal to the task of reducing it, the rational procedure would be for the surgeon to come to Nature's assistance precisely as he does in the case of the hypertrophied turbinate body, and trim the tonsils down until they approximate the normal both in shape and size.

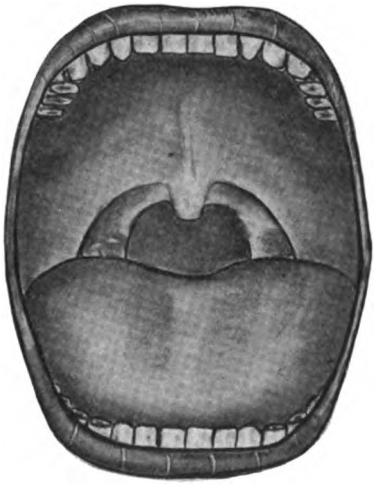

Fig. 4.

Palate with well defined pillars after tonsillotomy, the capsules being preserved.

The Degenerate Tonsil.—The degenerate tonsil may or may not be hypertrophied, but it is always more or less deeply imbedded between the pillars and behind a large plica-triangularis. When it is hypertrophied its interference with phonation is in all respects similar to that of the simple hypertrophied gland, and with the additional harmful influence of the catarrhal condition of the fauces which always accompanies the degenerate type of tonsil. Even when the gland is small we have marked congestion and hypertrophy of the pillars and plica, and often-

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times inflammatory adhesions binding them together in an unwieldy mass and making any independent action of the delicate phonatory muscles in this region quite impossible. The condition is one of chronic tonsillitis and pharyngitis, with more or less frequent acute exacerbations, and the larynx itself never quite escapes implication. The question, therefore, is not one of injuring the voice by operation, but of improving it, and in some extreme cases of actually saving it.

The voice is already injured. It cannot well be otherwise, for

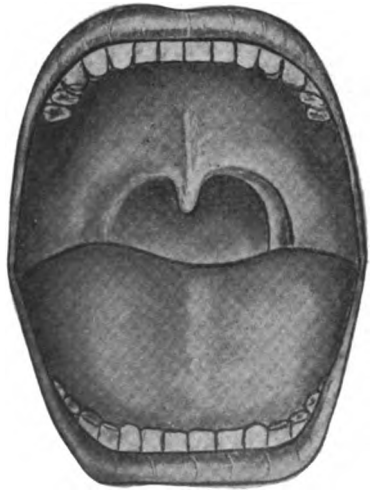

Fig. 5.

Right posterior pillar partially destroyed and its remnant adherent to anterior pillar, the fossae being entirely obliterated as a result of tonsillectomy.

the vocal instrument is structurally defective and altogether out of tune. No one ever yet heard of a really fine voice issuing from a throat partially filled with degenerate tonsils. Great singers and speakers do not have such handicaps, else they would not be great singers and speakers, and when such handicaps exist in young people from whom the future great singers and speakers must come, it is manifestly the duty of the surgeon to remove them.

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But how can this best be done? That is the question, and the one to which the last answer has not been given. We are all agreed that degenerate tonsils, whether or not they be hypertrophied, are a menace to the health of the individual, and I have tried to show why they are altogether incompatible with normal vocal development. It remains now to consider how we may deal with them in order to restore the pharynx to a condition that may at least approximate the normal, to remove sources of infection, and to give the important muscles, which to a great extent constitute the pharynx, a chance to perform their natural respiratory and phonatory functions.

In this connection the capsule of the tonsil may be worthy of some consideration, and a pertinent question may be—has the capsule itself any function in phonation after the tonsil has become degenerated or diseased? I think that it has a function, or at least that its removal often results in conditions decidedly harmful to phonation, such as adhesions between the muscles and cicatricial contractions of the mucous membrane. It is true that these conditions may be partially avoided by making only clean dissections and avoiding injuries to the muscles; but however well all this is done, after the operation, we rarely, if ever, see the palatal half arches and the fossae presenting themselves in all their original beauty of structure and outline, for we always leave a break in the mucous membrane corresponding in size to the size of the outer surface of the capsule, to be filled in with granulation tissue, and this, having transformed itself into firm fibrous or cicatricial tissue, usually binds the pillars together and interferes with their motility and flexibility in the production of voice. On the other hand, in old cases of chronic tonsillitis, the capsule itself, like the plica-triangularis, becomes hypertrophied and adherent to the surrounding muscles, so that its presence may be even worse than the cicatricial contractions and adhesions to which I have referred, and its removal by careful dissections may be strongly indicated.

When the capsule is not hypertrophied and no inflammatory adhesions exist between it and the surrounding muscles, we should probably get better results, so far as the phonatory functions of the palate are concerned, by removing the tonsil only

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and leaving the capsule intact. This is the more tedious and difficult operation, and in some instances it may be an almost impossible one; but, nevertheless, in selected cases the procedure should be at least attempted, because it leaves the palate in a better functional condition. Every case, therefore, should be a study in itself, and in all cases it should be a question of judgment with the operator as to whether a complete tonsil-

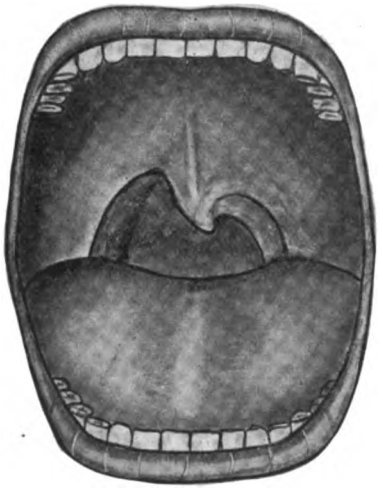

Fig. 6.

Deformity resulting from destruction of mucous membrane and muscular fibres connecting palato-pharyngeus muscle to the middle of soft palate on right side, after tonsillectomy.

lectomy should be performed, or an attempt made to do an extra capsular operation by some of the many methods which have been devised. As in so many other instances, the mistake is often made in supposing that a single operation is suitable to all cases, and we are not sufficiently governed in our choice of methods by the conditions as they present themselves.

The question as it now stands seems to be tonsillectomy vs. tonsillotomy, with a disposition to make one of the two operations applicable to all cases; but just as we decide upon one of many procedures in the correction of the nasal septum, so may

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we select the particular operation which is indicated for particular tonsillar conditions.

There are two important reasons for operations upon the tonsils, the first being to conserve the general health of the patient by removing a manifest source of infection, and the second, and scarcely less important one, to conserve and improve the functions of the neighboring respiratory and phonatory organs, and my contention is that the second reason for the operation is not given the attention which it deserves, and that important structures are often sacrificed in our zeal to remove sources of infection. Seeing as I do many children having defects of voice and speech and observing the conditions of their organs of speech day after day for many successive weeks, I have perhaps a somewhat unusual opportunity for studying the local, as well as the general, effects of the operations under discussion, and I confess to you that I have been amazed at the apparent disregard for the surrounding structures with which much of this work is done. The sacrifice of one or more pillars of the palate and of the uvula seems not to give some operators any concern whatsoever, and the results upon the voice and speech have been in some cases not only disastrous, but altogether irreparable. I have two children under my care at the present time whose palates have been so injured that their valvular action in voice production can never again take place, and certain tones of speech and sounds of voice can never be restored or acquired. I have another patient with a marked defect of speech that followed a careless digital examination of the vault, the operator appearing to forget the fact that one cannot put a two-inch cork in a one-inch bottle.

In this age of radical operations upon the tonsils by finger and other blunt dissections, there is grave danger of using greater force than these delicate structures can bear and of thus stretching them to the breaking point. As a proof of this, I have but to refer you to the drawings of some of the asymmetrical and otherwise deformed palates that have recently come under my observation and to exhibit to you one or two patients.

Conclusions.—Normal tonsils are in no way prejudicial to phonation, but on the contrary they may be helpful both in

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directing the action of the neighboring muscles and in modifying the resonance of the oral cavity.

Hypertrophied tonsils, on the other hand, are distinctly prejudicial to phonation, because they interfere with the action of the muscles, they deflect the vibrating column of breath and impair the normal resonance of the oral cavity.

Degenerate tonsils are prejudicial to phonation primarily because they are prejudicial to health, and secondarily, because they interfere with the action of important vocal organs, by

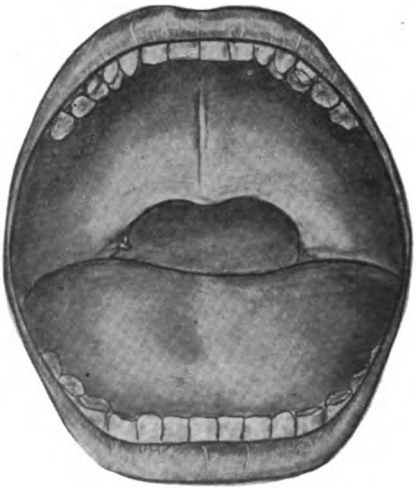

Fig. 7.

The uvula snipped off, pillars wounded on right side and adherent on both sides, with fossae obliterated, after tonsillectomy.

setting up a catarrhal condition in the oropharynx, which results in hypertrophy of the faucial pillars, the plica and the capsule, and in numerous inflammatory adhesions binding all these parts together in one conglomerate mass.

The two important indications for the tonsil operation are to remove foci of infection and to increase or restore the functional efficiency of the respiratory, phonatory and articulatory organs; and the operation that fails to meet the requirements of these two indications is more or less of a failure.

The tonsil that requires removal is always prejudicial to

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vocal excellence; but to do a little good in an operation, one should take heed lest he do a great harm. To do a satisfactory tonsil operation is often quite as difficult as to do any other operation in the region of the throat, nose or ear, and it requires quite as much skill. The tonsil operation, therefore, is the one of all others that should be done by the specialist, and it should be done with great care and deliberation.

The popular belief that the removal of tonsils is injurious to the voice is well founded, and it is due in large measure to careless or bad surgery.

I am indebted to my assistant, Dr. Adrian V. B. Orr, for the excellent drawings, from which the accompanying cuts were made.

Discussion on the Paper of Dr. G. Hudson Makuen.

Dr. D. Braden Kyle: I want to say a word about the irregularity of the palate. I have seen a number of cases in which the phonation is due to various conditions. It may have to do with the relation of the individual to his own voice. Suppose he has some adhesion about the soft palate pulling the palate up. In a child this may interfere with his subjective sound appreciation. That would be a mechanical interference. Suppose a child has difficulty in the development of his voice, this will have a great influence on his speaking qualities. In the training of the human voice it is very important to watch the children and see that no adhesions about the soft palate are allowed to go unrecognized. I have seen many cases in which just in one place along the speech register there is a shift in the voice made intentionally by the individual to overcome the liability of a false sound. You will often notice in singers where the palate is irregular they will twist their mouth to one side to suit the mechanical defect in the throat, and if you take the trouble to watch the individual when he strikes the note which produces this change in the position of the mouth you will see that his palate is pulled to one side.

The size of the tonsil has nothing especially to do with its dangers. I have seen some very dangerous little men and some very dangerous little tonsils, no larger than a pea. It is not so much the size as what is going on in the tonsil. A little tonsil has a chain of lymphatics down in front of the sternomastoid muscle just the same as a big one. I remember a case in which a patient was referred to me with orders to take out the tonsil

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and the adenoid, but the only operation that was necessary was the use of some vermifuge, and there was no resulting scar tissue.

Dr. G. Hudson Makuen (in closing): I have observed that those who discussed my paper were chiefly those who came in too late to hear it, and therefore I shall occupy a very brief moment in epitomizing what I said in my introductory remarks.

According to the views of many expert vocal physiologists the extrinsic muscles of the larynx are important factors in controlling the vocal cords in artistic phonation, and the intrinsic muscles are of themselves structurally and physically inadequate to the performance of this function. The extrinsic muscles chiefly employed in phonation are the palatopharyngeal, the stylohyoid, the stylothyroid, the sternohyoid and the sternothyroid. The combined action of these muscles in contraction pulls the larynx back against the spine, so that the posterior portion of the cricoid cartilage rests against the anterior surface of the fifth cervical vertebra, which is comparatively bare of muscular and other soft tissue. This gives the larynx a direct connection with the vertebral column, through which the vibrations of the vocal bands are transmitted throughout the entire body, thus increasing the vocal resonance to a very marked degree. The cricoid cartilage being held firmly against the fifth cervical vertebra in the manner described, serves as a fulcrum upon which the thyroid cartilage is tilted forward by the action of the palatopharyngeal muscles, the attachments of which are to the soft palate anchored above in the pharyngeal vault, and to the superior cornua of the thyroid cartilage below. The direction of the action of these muscles in contraction is upward and slightly forward, and their function in phonation, as I have said, is to regulate the position of the thyroid cartilage with reference to the position of the cricoid cartilage, and thus to stretch or relax the vocal bands, as the pitch of the voice is to be higher or lower. In other words, the palatopharyngeal muscles are thyroid tilting and cord stretching muscles, and I have tried to show how any obstructions to the action of these muscles, such as enlarged or diseased faucial tonsils, or adhesions and contractions following operations upon the tonsils, which may limit the free action of the palatopharyngeal muscles, must be prejudicial to artistic phonation.

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THE TECHNIC OF TONSILLECTOMY.

BY J. M. INGERSOLL, M.D.

A few years ago, when the complete enucleation of the tonsils began to be generally advocated as the best method of treating pathological conditions of the tonsils, we tried in our dispensary at Lakeside Hospital the various operations advised by different men and gradually evolved the following operative technic.

Ether is used for the anaesthetic and enough is given to completely relax the muscles of the jaws. Then a self-retaining mouth gag (Whitehead's) is placed in the patient's mouth and the patient is moved along on the table so that the head hangs freely over the end of the table. One assistant sits on the left and holds the head firmly with both hands, turning it slightly to the patient's left side when the left tonsil is being operated upon and vice versa for the right tonsil.

A second assistant stands on the patient's right side, holds the tongue depressor with his left hand and sponges with his right. A fairly broad flat tongue depressor is used, its distal end being bent downward slightly so that it can be hooked down back of the tongue and thus pull the tongue forward as well as depress it. The operator sits at the end of the table with the patient's head directly in front of him so that the relative position of each tonsil is the same. If daylight is used, the operator's back should be toward the window.

One tonsil is grasped with a pair of forceps and pulled forward and inward toward the median line. Then the mucous membrane over the superior part of the tonsil, just in front of the anterior pillar, is cut with a pair of scissors.

The primary incision should be carefully made through the mucous membrane only. When the incision extends down into the tonsillar tissue the tonsil itself is more liable to tear and the dissection becomes difficult or almost impossible. Usually the glistening capsule of the tonsil can be seen through

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the primary incision. A blunt dissector is inserted behind the capsule and the velar lobe of the tonsil is freed from its attachment to the anterior and posterior pillars and the surrounding tissue. If the blunt dissector does not separate the tonsil from the surrounding tissue when moderate force is used, then the firmer attachments are severed with the scissors. In this way the tonsil with its capsule is dissected entirely free from the anterior and posterior pillars and from its attachment superiorly and somewhat inferiorly.

A considerable part of the successful enucleation of the tonsil depends upon the careful dissection of the superior portion of the tonsil and its capsule. When the dissection is complete, the tonsil should be so free that it can be easily drawn out beyond the faucial pillars.

The wire loop of a Tyding's snare is placed over the tonsil, which is then grasped with the forceps, one blade in the supratonsillar fossa and the other in the inferior part of the tonsil, and pulled forward so that the whole tonsil extends through the loop. It almost goes without saying that caution should be used to see that the uvula is not caught in the snare. The snare is closed slowly, and it naturally follows the line of least resistance, namely, the attachment of the capsule to the surrounding tissue, and the tonsil with its capsule is shelled out from the tonsillar fossa.

A gauze sponge is then packed into the fossa and held in position for two or three minutes by firm pressure with the index finger while more anaesthetic is being given, if it is needed. This firm pressure usually stops the bleeding, and when the sponge is removed the fossa is carefully inspected. If there are any bleeding points, they are grasped with ordinary hemostats and twisted. If an artery large enough to spurt has been cut, it is grasped and a buried catgut ligature is passed around it and tied tightly. We have found that unless the ligature is anchored in the tissue around the artery it is liable to slip off and cause secondary hemorrhage. In other words, tonsillar hemorrhage is dealt with in exactly the same way as hemorrhage in any surgical operation and is controlled by pressure, torsion or ligation.

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The second tonsil is then operated upon in the same way, and when the hemorrhage in each fossa has been completely stopped an adenotomy is done, if necessary.

The patient is kept in bed three days and is given soft or liquid diet. The only after treatment is an alkaline mouth wash. Sprays, gargles and local applications are contra-indicated.

The operation is always done at a hospital or under favorable circumstances at the patient's home. Ether is used for the anaesthetic in adults, as well as in children, for it has been our experience that there is more liability of considerable hemorrhage in an adult than in a child, and the hemorrhage can be more easily controlled under general than under local anaesthesia.

We do not claim any particular originality for this method of operating. The position of the patient has been fully described before and is known as the Rose position. This position offers some decided advantages over the other positions commonly used. It is equally good for the use of direct or reflected light. The relative position of each tonsil is the same. The blood tends to gravitate into the nasopharynx, away from the field of operation, and is less liable to be inspired. The operative field can easily be sponged and kept clean by an assistant. Severe hemorrhage can be more accurately observed and efficiently controlled.

The various steps in the operation are the same as, or similar to, those of other men. We think that a cleaner and better dissection of the tonsil can be made with an instrument devised for this purpose than with the finger. Our method of dealing with hemorrhage is, as far as we know, somewhat different from that of most operators. In our experience it has been very efficient. The average time necessary for the operation is from eight to twelve minutes in uncomplicated cases. The time needed to anaesthetize the patient varies greatly and is usually more than the time used in the operation.

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CASES OF LATE SECONDARY HEMORRHAGE AFTER TONSILLOTOMY.

BY F. E. HOPKINS, M.D.

The last two or three years have brought me an unusual number of cases of hemorrhage, *both primary and secondary,* after tonsillotomy. These have been almost wholly among adults. Seeking a cause for this experience I find a greater number of adults have within that time insisted upon the use of a general anaesthetic. Primary hemorrhage, especially with adults, is more profuse under a general anaesthetic, and it is possible that I have been more radical and the deeper removal involves a greater liability to hemorrhage on the separation of the slough.

Thus far only inconvenience to patient and physician has resulted. The operations have been done at the hospital and the patients kept longer under observation. Pressure with the tonsil clamp has promptly controlled the hemorrhage, and while this method may seem crude, it is readily employed by the house officer, and is so effective that it may well be relied upon.

Confident that hemorrhage, primary or secondary, can easily be controlled, it was not my purpose so much to discuss the subject as to place on record some instances of late secondary hemorrhage, and I offered "Late Secondary Hemorrhage" as a title for this case report. For many years I have felt secure if the sixth day passes with no bleeding, and while in literature one chances upon a rare report of hemorrhage as late as the twelfth day, no such case had come under my observation, nor have I heard its occurrence referred to in discussion. The two following are illustrations of late secondary hemorrhage:

T. M., boy age seven, Northampton, Mass., in good health and no family history of hemophilia, operated upon under ether June 21, 1910—submucous removal of septal exostosis and tonsils and adenoids. Reported over telephone June 30 that at 5 a. m. patient awakened, vomiting blood swallowed during sleep.

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July 2—Bleeding continued at intervals and at 12 m. prostration was so marked that I was requested to call. Nasal wound healed; right tonsil healed; bleeding from left tonsillar space; patient very pale, rapid, weak pulse, restless, and at intervals vomiting of swallowed blood. Clamp applied and bleeding controlled.

July 3—The attending physicians, Dr. Fay and Dr. Shores, reported no more hemorrhage and added a further interesting statement—from its possible causative bearing—that the child showed a well marked eruption of measles. Here was secondary hemorrhage on the ninth day and again on the eleventh day.

Wm. A., nineteen years old, of poor resistance and rather bad family history, father dying of tuberculosis—referred to me by Dr. Ward, of Springfield. Nasal respiration obstructed and in addition he had adenoids, hypertrophied tonsils and lymphoid hypertrophy at the base of the tongue. He is in poor health, his invalidism induced by an endocarditis which left a badly damaged heart, the lesions remaining being both obstructive and regurgitant. The strong pulsations communicated to the larger vessels give the water-hammer pulse and the tonsils were lifted with each pulsation in a way to suggest danger in their removal. Dr. Ward was firm in his opinion that operation was necessary, because of the frequent throat infections and the severe systemic disturbance attending such infections.

The tonsils were removed at my office under cocaine anaesthesia May 12, 1911—the Farlow punch being used. Very little bleeding attended the operation. The patient was taken to the Springfield Hospital, where he remained three days. He was driven to his home—a journey of twenty miles—and put to bed.

Early on the morning of the 17th hemorrhage began and continued more or less during the day. I saw the patient at 9:30 p. m.; bleeding had ceased and both tonsillar spaces were filled with clot. Vomited blood in quantity was exhibited by the nurse. May 22 further hemorrhage occurred, and by this time the family were panic-stricken, and a second visit was necessary. An oozing which had continued for five or six hours was still going on from the stump of the left tonsil, the right having healed. This soon ceased under pressure, but recurred again two days later

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and in quantity sufficient so that there was again vomiting of swallowed blood, and the stools were black and tarry for two days following. Since the 24th there has been no further bleeding.

Recapitulating.—Practically no bleeding attended the operation, but a severe secondary hemorrhage occurred on the fifth day, another on the tenth and still a third on the twelfth.

Discussion on the Papers of Dr. Ingersoll, Dr. Makuen, Dr. Getchell, Dr. Thrasher and Dr. Hopkins.

Dr. George B. Wood: I want simply to record a case of secondary hemorrhage following the removal of adenoids. It occurred in a patient about sixteen years of age on the seventh day after the operation and was severe enough to require etherization and packing of the vault.

Dr. George L. Richards: With reference to hemorrhage, I have had two cases of late hemorrhage. One was operated on a Tuesday, went shopping fifty miles away on Saturday, and had a severe hemorrhage on Sunday. The other occurred five days after operation.

With regard to the question of adenoids. In our experience we have had a death from secondary hemorrhage after an adenoid operation, not done, however, by ourselves. The case was that of a child, who was evidently one of a family of bleeders, although it is doubtful if this fact was known by the physician who did the operation, the details of which I do not know. The operation was done at a hospital, and bleeding began the same day. It was several times stopped by the packing of the naso-pharynx, but began again in each instance some hours later, the packing eventually becoming soaked through. Fresh packing would control the hemorrhage for a time. One week from the time of the operation the patient was seen by my associate. At this time the child was completely exsanguinated, but not bleeding. He was called again the following morning, on account of the extreme condition of the child, and tried transfusion. As soon as the blood pressure began to rise, the pharynx began to bleed again, and the child apparently inhaled some blood and began to suffocate. For this a hasty treacheotomy was done, but without avail.

As to the technique of tonsillectomy there are a good many ways it can be gotten at by methods with which you are all familiar. Dr. Ingersoll's technique is most excellent.

I take exception to Dr. Makuen's statement that because you find a large hole on one side of the palate, and not on the other, it

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is necessarily the result of a bad operation. Sometimes the supratonsillar fossa goes quite high up, and whether you take the tonsil out by any method advised, or simply by the finger, you will occasionally find the hole which the tonsil occupied comes up higher on one side than on the other. So far as instruments are concerned, you can do a tonsillectomy by strong traction on the tonsillotome.

Dr. Thomas Hubbard: The method described by Dr. Ingersoll surpasses any method of my experience in point of comfort to the operator, and the facility with which ordinary daylight is utilized.

By this method the period of anesthesia is somewhat prolonged and the ether intoxication may therefore be increased, but on the whole I think it is very satisfactory and safe.

Dr. J. Solis-Cohen: I believe in the Museum in the College of Physicians, of Philadelphia, there is a specimen from one of my patients of a remnant of adenoid after secondary hemorrhage in which you can see the artery running through the tissue.

Dr. W. E. Casselberry: The cause of a late hemorrhage is the reopening of a blood vessel by the separation of a slough. I have seen it occur at eight days after the old-fashioned galvano-cautery snare operation. A slough forms also occasionally after a cold snare operation and after a punch operation, part of the surface, and in small specks on the surface after any operation, and at about the fifth, sixth or seventh day this slough, which may be in combination with a fibrinous exudate, either separates in patches, or dissolves away. If in patches, it may happen to open a vessel. In a five-year-old boy it happened following violent exercise on the seventh day after a cold snare tonsillectomy, and in a fourteen-year-old girl on the sixth day. The clamp has served me well for secondary hemorrhages. It, however, requires skill in its adjustment, is not a pleasant remedy for the patient, and it is difficult to judge how long to leave it in position. I have removed it after twenty minutes without recurrence of bleeding, and again after having left it on for three hours had a recurrence. I once left it on over night. From one-half to three hours is the average time it will be needed. Also judgment is necessary as to the degree of pressure. Having cocainized the throat one can make more compression than is safe to the tissues, and still be within the tolerance of the patient to bear; but I have not in my own practice known dangerous sloughing, or any other detriment, to follow the application of the clamp. I rarely hear mentioned now the galvano-cautery point electrode to which I often resort effectively for arterial hemorrhage during and immediately after operation on the adult before he leaves the operating chair. I dislike to operate on an adult without the galvano-cautery elec-

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trode ready to pick up, and when a vessel spurts I find a minute burn on the spot to be the quickest and most efficient remedy and less trying to the patient than applying a haemostat or ligature. One might think it would favor the late type of hemorrhage on separation of the small slough, but I have not found it to do so, probably on the principle that lightning rarely strikes twice in the same place.

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ARE THE TONSILS A MENACE OR A PROTECTION?

BY HENRY L. SWAIN, M.D.

If, in answer to the above question, we were to judge of the opinion of the majority of operators in this country on the principle that "a workman is known by his chips," or to form an idea as to how necessary it is to remove the above mentioned menace by the amount written upon the subject, and the multitude of ways described, and the instruments devised in the last four years to carry out the alluring, spectacular, and gory operation called tonsillectomy, we would not only assume that everybody thought tonsils a dreadful thing to have around, but that any physician or surgeon who did not, on sight, enucleate every tonsil was not only derelict in his duty, but a renegade deserving lasting contumely.

When an author speaks of his experience in upwards of 9,000 cases, mentioning especially 3,000 removed within the capsule within the last six or seven years—the only method which he thinks is really worth the while—he certainly has a right to speak advisedly as an expert in regard, at least, to methods. Also, it will be readily deduced that he felt that in removing tonsils thus wholly he was not depriving the patient of anything important. When it is the practice in recent years of many operators all over the country to always enucleate the tonsils as completely as possible in all cases, either children or adults, as a routine procedure, it would certainly seem to argue that, in general, tonsils are better out than in. The question of relative size, appearance, healthiness of structure, or any such matter is apparently never thought of. Remove anyway, and dismiss the matter as not worthy of further consideration.

Take this Association, the leading exponent of and representing the most enlightened sentiment in this country if not the whole world, its opinion is looked up to as expressive of the broadest and deepest possible insight into the problems of the physiology and pathology of the upper air passages. In our

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annual meeting, in Boston, two years ago, presided over by that prince of level-headed observers, Professor Coolidge, only one man had sufficiently the courage of his convictions to say a word apparently in contradiction of the general opinion of the men present. He said: "The question of the removal of the tonsils revolves upon the point whether the tonsil is a necessary organ or not. We should remember," he further stated, "that they have an internal secretion *sui generis,* both afferent and efferent lymph vessels, and although there may be diseased tissue or crypts, we could often take away enough of these deformities, and yet leave enough of the organ to perform proper functions." In keeping with this view, he thought that he knew of patients where, in view of later developments, he wished there had been left in some of the tonsil tissue he had removed. This view was expressed by the elder Shurly, and any formal statement from him is entitled to all the serious consideration which his broad experience and great learning justify.

He was followed by Dr. Casselberry, who frankly stated that he believed just the contrary, and lived only to regret that he had not removed more rather than less. And those of you who attended the annual dinner remember how he very drolly described how he was supposed to have dreamed, while asleep that afternoon, that in the next world he was persecuted by the ghosts of those who had gone there because he had not removed their tonsils or enough of them.

All those who spoke seemed to favor Dr. Casselberry's belief. Only one, Swain by name, in discussing a later paper on the following day, expressed his opinion that the tonsil was of the same importance, no more, no less, as any other lymph node. If one had incised the neck for any reason, it was not thought necessary to take out all the lymph nodes because they were visible or palpable. Only when they are thought to be diseased do we remove them. So, it seemed to him, it should be with the tonsils. If in the way because too large, why not do as we always used to do, and take away enough to fill the bill and leave the rest? If diseased, then, and then only, do a tonsillectomy. Tonsillectomy as a routine procedure, especially in the young, would then be entirely unjustifiable under any other than diseased

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conditions, unless we could rule positively that the tonsil has no function.

A most intelligent and enlightened physician who, quite contrary to the usual rule among such, is the father of a large family, last year had to have the tonsils of one child removed because, during the previous winter, the child had an attack of general cervical adenitis which was slow in subsiding, causing the father to fear that the tonsils might be tuberculous. While the surgeon laryngologist was at the house he had a younger child who had never had any trouble with his tonsils, but who might possibly have, also completely robbed of his adenoids and both faucial tonsils. This winter cervical adenitis was much in evidence, and his family was one of those attacked. The first child in the family to succumb was the younger one, who was especially operated upon to avoid it. He had it the hardest, and his glands were much slower in going down than three of the other children whose tonsils, by some oversight, were still present in their interiors. The older tonsillectomized child was away from home. Certainly the tonsils in the younger were not a menace, for they were not there, but their absence might have been, and the whole clinical history thus briefly chronicled plainly points to the fact that the absorption into the cervical lymph nodes probably was not through the tonsils at all in any of the cases, but that the tonsils only enlarged just the same and for the same reasons that the other lymph nodes did.

Two students, from different cities, were treated by me for sore throats during the fall term of year before last. This last fall I treated them for the same kind of sore throats which they had had the previous year, and each had glandular enlargements in the neck. In examining their throats there was disclosed a harrowing tale. The executioner had been at work, and plainly did it show. They had each, in an unguarded moment, told their respective families that they had had, during the previous year, a severe sore throat. Each was hurried to the family specialist, and the tonsils found enlarged and a menace; they were condemned to the block, and each tonsillectomized. One had to have the pillars of the palate on both sides sewed together to stop the hemorrhage. The resulting cicatrix had caused considerable tightening and consequent interference with the motion of the

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palate. The other had lost on one side the posterior pillar of the palate, and a rude adhesion narrowed down the opening into the nasopharynx on that side. The former came out of the hospital weighing fifteen pounds less than when he went in, was a long time in recovering his strength, and had been brought that low because his tonsils were a menace. I have treated him three times for sore throat; once before, twice since the removal, and each time the nasopharynx and the lateral columns were the parts primarily involved; the tonsils, on the first occasion, only secondarily, if at all.

The same thing happened to the very erudite observer who is now in the act of reading this paper to you, only, being of a conservative nature, and holding pretty firm convictions as to his duty, he simply followed, as we all do, his routine hobby. A Vassar girl came with the report that she had frequent attacks of tonsilitis; could Dr. Swain prevent them? Surely. He freed the small tonsils from the pillars, slit up the connecting crypts, removed the contents of the crypts, and shrank the general mass by ignipuncture. Result: Tonsils small, Nodular, flat and discrete. Patient gained four pounds in weight during the treatment, as is often found to be the case. Her pillars were all right, and there were no deformities anywhere, and no serious hazard to life. She, too, went back to college, and promptly was sent home sick with sore throat. Dr. Swain was interrogated over the telephone as to what he thought of the matter. He replied, voicing his ignominious chagrin, but begged to have one last, long lingering look at the fair maiden's throat. It was reluctantly granted. He discovered that he, too, had been incorrectly informed, as the home doctors had in the previously reported cases, and again it was the lateral column of the pharynx which was involved. Proper operative treatment was undertaken, and the young lady has never, to my knowledge, had any further trouble, and this happened five years ago.

If further comment is necessary upon this sad picture of two very eminent men and my lesser self so readily led to butcher the tonsils, each in his own way, it is to state more definitely the purpose for which this sorrowful tale was here introduced, viz.: to show how universally exists the readiness to blame the

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tonsils; and furthermore, how little we know, or how little we deduce from the appearance of a tonsil, as to how much of a menace it really is. None of us (for I personally know and vouch for both of the other men) would have for a moment put the patient through what we did had we not supposed it was our duty. We will cheerfully admit that the evidence was wrong, but it does not change the facts. And what happened to us is frequently happening all over the world, viz.: that tonsils are unnecessarily subjected to our surgery. Certainly it would seem that we all believe that the tonsils, especially the faucial, are not of much account, and are a menace, or there could be no justification for our enucleating tonsils in young children as a routine procedure when they are simply enlarged and when, in years past, a simple tonsillotomy has given such very general satisfaction.

Furthermore, there is the undeniable fact that the good which the tonsils may do is believed to be so small, and on the other hand, they seem to be the cause of so many systemic diseases, many of them of the severest type, that if one could remove a source of infection so easily the good thereby done would more than counterbalance the harm resulting from any loss of function. Or, to put it another way, it would be necessary to prove that the tonsils do have some function, some definite office to perform, before we even hazard the raising of a hand to call a halt on the indiscriminate removal of these structures from their snug resting places.

It would also help this cause along if we could prove that often, instead of removing the cause of tubercular infection and rheumatism, we really took away one of the "life guards" which in health, at least, prevent the trouble from going deeper. We have already hinted at a line of argument which readily showed that often at least the faucial tonsils were credited with causing systemic disease of which they are really only sometimes the cause, and frequently the enlargement resulted from disease in other situations, sometimes the very disease we hoped to cure by the tonsillectomy.

To discuss the last point first, the question of tuberculosis and rheumatism. For both these causes it is now the custom to ex-

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tensively advise the enucleation of the tonsils. The internist has added impetus to the movement by many times going so far as to insist that in every case of rheumatism, or even in indefinitely recurring rheumatic manifestations, the tonsils should be removed, meaning by removal enucleation—always, in the adult, a serious operation. This is done in some instances entirely by rule of thumb, never even inquiring or still less caring whether the tonsils were even previously sore in any way connected with the clinical process. As a result of this general working rule some very brilliant hits are made, but apparently fully as large a number are put through the mill without an atom of good resulting in any way, for, as before stated, the tonsils may be absolutely innocent.

Now it is a most excellent condition of things, in one way, to be operating laryngologist to a busy internist who takes the entire responsibility of removal. Failures and successes are alike credited against him, but it is a case of blissful inexactness which I consider deplorable. It would seem to me that any well equipped laryngologist could with a little care, thought and watching, easily tell whether a given tonsil was causing trouble or not. Granted that the patient is thus referred to him for an opinion, he would, in positive cases, always operate. In doubtful cases, especially when there is a good fee in sight, he could likewise be counted on to do his operative duty. But in a goodly number he would assure the patient and the consultant that the gentle attentions of the knife and guillotine might be dispensed with. He would often readily discover that the source of the rheumatic infection was somewhere else in his department and the therapy would be placed on an exact basis. This would seem surely ever so much to be desired when we think of the seriousness of the operation of tonsillectomy as it sometimes turns out.

After all, is it not the viewpoint of the beginner and the uninformed that we would seek to make more conclusive and clear? This audience does not need instructing; still less from me. But true to our motto, while making a clear picture for others—teaching—we may discover a different, broader view for ourselves. It is perhaps this in the background of my mind which makes me feel that this harangue is at all worth while. If any

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one of the gentlemen making up this noble body of men known as the American Laryngological Association felt that it was wise to enucleate any given pair of tonsils, there is no doubt as to the results. It would be neatly and safely done. But it is the impression that we give, or that we have recently given, perhaps, that all tonsils are to be enucleated if operated upon at all, and that no other way exists of meeting the indication, which is having a very bad effect upon the young, ardent and ignorant operator. Tonsillotomy, the good old fashioned slicing off of the projecting tonsil, was the first and most frequently done operation by the beginner in the days just gone by. The young operator of to-day, following the inherited instincts of his profession, feels likewise perfectly competent to do an enucleation as one of the first things that he attempts, and I do not think it is safe. Much mischief has been done, and looking upon it in the mouths of young men from all over the country, I am sometimes appalled. I often see the work of you gentlemen, the best in the country, and to judge by other post-operative results, I must see some of the worst. Presumably, in the case of most students who come to Yale, the best talent obtainable in any given locality would be the one which the intelligent and well-to-do families represented would naturally have employed. If to men who are especially qualified such accidents happen as occasionally do and as I myself have seen, what must be the result when inexperienced and unskilled men take the lives of their patients in hand as they seek to imitate what they think we by our example have taught them? This carelessness or thoughtlessness on our part, if such really is the case, must surely arise from a certain bit of indifference, perhaps due to a faulty conception of the conditions.

Until very recent years, we have always been brought up to believe that the tonsils had no lymphatic vessels leading into them. It was a long time before it was at all conceded that they really are what they are, an important part of the lymphatic system. Even after the serious admission of that point it was still believed that, whereas lymphatic vessels led from the tonsils into the deeper-lying structures in the neck connected with other lymph nodes, and, by virtue of well established channels, communicated directly with the deeper lying nodes as far down as

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into the interior of the chest, to say nothing of the connection through the thoracic duct with the circulation of the blood proper, still, we failed to think of anything entering the tonsils other than through their surface. Astonishingly different views are now being brought to our attention, and if we are at all alert to our duty we must at least give them serious and proper consideration. If we do this, I feel confident that there will be a gradual change of view to a proper level. The pendulum has swung so far toward radicalism that it must soon revert to a more conservative position which will be nearer the line of truth.

For years we have clinically known what has been called especially to our attention by many observers in written publications, and rather prominently by Fraenkel, of Berlin, that in the presence of acute coryza quite notably, sometimes following cauterization of the nose, as a result of difficult eruption of wisdom teeth in the adult, and even sometimes as a result of an inflammation of the nasopharynx and lateral columns, a tonsilitis has supervened. Of course it is purely a secondary process, as we could easily observe clinically. For years the fact was impressed upon me that if I could get children past the sixth or seventh year without removing their adenoids and without doing the then universal clipping tonsillotomy, the child would seem to grow out of the necessity of these operations and would go on to the developing of a perfectly healthy, normal individual. Sometimes the indications seemed to be absolutely certain and conclusive that operation was necessary, and for some reason or other it was deferred, not from any advice of mine, but because of circumstances which supervened, and the necessity passed by; the tonsils shrank, the adenoid retreated, and the patient grew and waxed strong. All of these observations had been clinically thoroughly and frequently observed, but it had not occurred to me to attribute the cause to any given source. Especially the last suggestion as to the child from six to eight years. I had been at a loss to account for the observation in any intelligent way until I read a paper[1] by Dr. George H. Wright, of Boston, where he described a certain functional relation of the tonsil to the teeth, and wherein he attributes quite properly the cause of

[1]Boston Med. and Surg. Journ., May 20, 1909.

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the enlargement of the faucial tonsils especially, not merely the lymph nodes in the neck, but the faucial tonsils themselves, to the changes in the nutrition of the parts necessary to the proper eruption of the teeth and often resulting from their improper general care. He reported a record of 150 cases where operations on the tonsils have been deferred awaiting eruption of the molars, not only in the six year period, but in the twelve year period, and when the dentition had been completely accomplished the glands in the neck went down and with them also the tonsils. He suggested the rather ingenious idea that the cervical lymph nodes, in trying to take care of the products of tissue change and tissue formation, being a bit overworked and being unable to do the duty devolving upon them, certain of the products were pushed back into the lymphatic vessels leading to the tonsils, and that the tonsils themselves enlarged as a result of thus trying not only to do their own work (allowing they had any), but also that which was thus forced back upon them. He apparently proves this by the facts that he has observed so frequently that he feels sure they must be correctly correlated; that when the teeth are properly put in order and the dentition over the tonsil again recedes without further or other treatment.

Ashurst goes a step further[2] and calls the tonsils even eliminating organs and as the result of cases observed by him thought the sequence occurred as follows: First the patient had a cold in the head, then swelling of the glands back of or under the sterno-cleido-mastoid muscle, then finally inflammation of the faucial tonsils, this last being apparent after the glands at the angle of the jaw had begun to swell. His deduction was that the rheumatic manifestation which was present in the tonsils was due to the effort of the tonsils to eliminate that which was forced in upon them. The theory of Wright and his own in a way very closely approximate one another.

Now is there any evidence of a more strictly anatomical or scientific nature which would explain these points? Von Lenart[3], in a number of different animals, very conclusively, carefully and definitely proved that there were lymphatic vessels leading into

[2]American Journ. of the Med. Sciences, July, 1909.
[3]Fraenkel's Archives, bd. xxi., 1909.

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the tonsil, i. e., that the tonsil was just like all other lymph nodes, had afferent and efferent vessels. Not that he was the only one to observe this, but he deserves special mention by virtue of his careful experiments on animals of various types. He proved, for example, that inert coloring matter injected into the nasal mucous membrane on one side would not only be found in the tonsil of that side, after a proper length of time, but would also be found in the tonsil of the opposite side, showing that there is a free anastomosis of the vessels of the two sides, and that septic or other matter present in the nose can find a direct channel for passage into the tonsil. This explains, to my mind, all of the varying conditions and clinical phenomena which we have in the last few paragraphs referred to. We do not need to ring in either of the ingenious theories of Wright or of Ashurst. Nor need we like Schoenemann[4] think the tonsils always to be secondarily affected from the nose, but we must admit that this sometimes surely is the case.

If one follows the lymphatic channels, as is shown by the work of Gruenwald[5], even from the accessory sinuses they will be found to converge into the larger vessels which collect in the region above the soft palate directly over the vessels which must lead into the tonsil, and hence even from the accessory sinuses matter may land in the tonsil proper. From the teeth themselves, and from any disease of the alvelolar process of the palate, therefore, the direct absorption carries that material into the tonsils proper, as well as into the other nodes of the neck, so that the tonsil may not be having work forced back upon it, but is really getting the work at first hand. Also, this knowledge of the lymphatic vessels going directly into the tonsils would very readily explain the observations of Ashurst, which I have happened to see duplicated three or four times within the last year, how the tonsil was directly infected by other portions of the nasal tract. In my own cases the original infection was in the nasopharnyx.

This also applies very appropriately to the question of tuberculosis. I have, on a number of different occasions, expressed my belief that the tonsils were only one of very many sources of

[4]Fraenkel's Archives, bd. xxii., 1909.
[5]Fraenkel's Archives, bd. xxiii., 1910.

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probable absorption of the tubercle bacillus, as from points in the nose, and particularly in the nasopharynx and lateral columns, and now that it is possible to believe that matter may go from the nose, diseased gums or alveolar process directly to the tonsil, I am firmly of the belief that some of the cases where tonsils, after removal, have been found to include in their interiors tubercle bacilli, the tonsils themselves are merely doing the work that any other lymph gland does; that when the tubercle bacilli enter it, the effort is always made to retain them there, dispose of them if possible, and thus not allow them to go further and deeper into the interior, and that these bacilli came by way of the afferent lymphatics to the tonsils and not necessarily through the surface.

I want again to voice my surprise that the general surgeon is often so active and so thoughtless in his removal of lymph nodes. The custom as usually carried out would seem to be that if one is to remove tubercular lymph glands, as from the neck of any patient, not only to remove those that are visibly and evidently enlarged and diseased, but to take out every gland that is visible and even palpable. It may have been taken for granted that the previous medical advice has been such that all known sources of infection have been removed before the attempt is made to take away what is really the effect, viz.: the enlarged lymph node in the neck. When, however, one has removed all the nodes, as is and sometimes must be done in some of these radical operations upon the neck, so that both the superficial and deep nodes are pretty thoroughly cleaned out, what protection has that patient from absorption from anywhere within the upper air tract? If the lymph nodes are supposed to purify the lymph from and to obstruct the progress of deleterious matter toward the deeper and more vital portions of the body, if these protectors are all removed, what is there left to prevent germs that are absorbed from going directly down into the thorax and deeper lying organs? And if you add to the above the removal of the tonsil, another of the protecting lymph nodes, when matter is absorbed into the lymph channels lying higher up, is there not bound to be some obvious result of this state of things? The natural inference would be that certain forms of tuberculosis would be

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more frequent just from all this surgical activity if for no other cause, and I have been rather expecting to hear it from some source. If any of the contentions which will later be brought forward as the obvious corollary of some of the observations herein stated are at all reasonable, we shall in the next ten or fifteen years discover that certain things will result, and the first statement which I have heard of anything of the kind that seems to be in line with the above is that of Dr. E. Hermann Arnold, of my town. He feels confident that bone tuberculosis, especially in children who have had their cervical lymph nodes generously removed, is more frequent than it ever used to be. I believe that his observation will certainly be duplicated by that of others.

The only possibility which allows one to escape from the logic of what has just been presented, viz.: that if you remove a lymph node, you remove one of the guard which is protecting from the invasion of germs and infected material, and every one removed is one less to help and protect (and the tonsil now, in view of well ascertained facts, has to be put into the same category as any and every other lymph node, and when it is completely removed for other causes than absolute, inherent disease, a definite force for our good has been taken from us); the only way we can avoid the logic of this, I say, is to definitely state that we are all wrong as regards the office of the lymph node, and this is untenable.

Did one desire to have further proof of the extreme probability that the tonsil is to all intents and purposes a lymph node, all that is necessary is to look at a microscopical section of a cervical lymph node and one from one of the beautifully artistic results of the modern tonsilectomy, both prepared in the same way. The arrangement of the hilus and body of the gland may vary a bit, but the picture, when looked upon in a general sort of way, is so evidently similar that one could not for a moment believe that the functions of the two could greatly differ.

I cannot sympathize much with the viewpoint that the tonsil has an internal secretion other than the fact that it contributes lymphocytes to the general circulation as do all other lymph glands, but until it is generally proved that other lymph glands have an internal secretion, I am not prepared to admit that the tonsil itself has.

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The question arises how much of its enlargement is surely like that of other cervical nodes, i. e., one for which it is itself not at all to blame? It enlarges, presumably, in performance of its function, and its sole function is not merely to absorb through its surface. In fact, it may do exactly as Ashurst suggests: it may try actually to eliminate.

Brieger and Goerke have expressed their belief in the so-called *Durch-Stroemungstheorie,* which is to the effect that there is a constant flow of lymph from the interior of the tonsil through to its surface, and not only that leucocytes and lymphocytes occasionally wander through to the surface, but that there is an actual fluid outflow through the interstices of the epithelium exactly as there is in the nose through the interstices in the nasal epithelium, and this outflow especially protects in the case of the tonsils from the influx of the germs from the surface and that the impurities within are thus washed to the surface and carried out and swallowed. Only when this flow ceases owing to internal or local conditions could infection take place. This I am not prepared either to accept or condemn, but it certainly shows that other functions are to be conceived than that of merely soaking up from the surface as does a sponge, which has been all that has ever been credited to the tonsil in the older ideas.

O. Levinstein, of Berlin, who is associated with Fraenkel in the Berlin Polyclinic, has done as much individual work and spent as much thought on the question of the function of the tonsil as anyone whom I have been able to discover in recent literature. Certainly, he has a right to state almost *ex cathedra* a definite opinion. After a review of all the theories that have been advanced, the protective, the absorptive, the *durch stroemungstheorie,* the theory that it possesses a function as suggested by the experiments of our own George B. Wood of contributing largely to the production of white corpuscles from its epithelium and that all adenoid tissue has this function, after giving all credit to the ideas exploited by all authors, ends up with the confession that he feels that every one and all of them fall short of expressing definitely what the function of the tonsils is. He leaves you entirely, in a way, without a leg to stand upon; finding evidence which seems to contradict that any one of these theories is the sole function of the tonsil. In this last I believe that he is right. I believe that no one single

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thing explains what the tonsil does. It may do all of them, but I think we can safely assume that it is absolutely, in every sense and in all senses, a lymph node, and as such should be protected from rude destruction. Whatever its humble office may be, it had better be allowed to perform it; if not, some other deeper lying node has got to do it. And when this deeper node does, by any chance, protect from an invader, which the removed tonsil should have held up, the septic matter is nearer the more vital portions of the body by having gotten beyond the first barricade. This idea comes comfortably to explain the conservatism which I have always exercised in the treatment of tonsils in the adult. I have, for years, followed out the practice suggested by what I did for the Vassar student, freeing the pillars of the palate, slitting up the crypts which burrow and underlie the surface, getting rid of all retention spots, and shrinking the tonsil by ignipuncture. If very large, naturally, diminishing the size by punch forceps or by removing the larger portions by scissors or guillotine, but rarely tonsillectomizing. I feel that I have been able to do for my patients, safely, comfortably and thoroughly, all that has been done by the other methods. I trust that I may be understood that in this respect I am speaking of routine procedures. When I believe a tonsil is thoroughly diseased I presume no one of you is more thorough in removing it than am I, but it is only when I think it is thoroughly diseased that I have so done. The chief dependence for the shrinking other than by the occasional clipping has been the galvanocautery ignipuncture method. Each of us has our habits, as I have said before in this paper, and this has been mine.

It has been with peculiar pleasure that I have read Levinstein's article in the last number of Fraenkel's Archives, where he, from entirely independent observations carried out carefully and for years, comes forward with the plea that it is often not necessary to do anything more than to thoroughly slit up and shrink the upper lobe of the tonsil. He quite truthfully insists that by far the most frequent source of the quinsies from which people suffer is the upper lobe of the mass. If this is properly freed and opened and taken care of, that is all that is necessary in a great many cases. In his usual thorough way he goes at great length to explain and justify the position which he has in a way empirically

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and clinically observed, and it is with singular pleasure that I in my humble way speak in confirmation of what he has said and claimed. As he wisely says, if there be any function to be attributed to the tonsil, you at least leave a large enough portion of the tonsil behind, in this way, so that it can readily perform its duties.

Now, if there is any wheat amidst all this chaff so cheerfully borne by you in its tedious presentment, it must be this, that as to the young the lymphatic system is a necessity, we should let the young have all of it, unless removal of any portion of it is necessary because of disease. If at any time of life tonsillectomy is to be criticized, it is in the young child under six or ten, and my plea, which might at this juncture be termed a wail, is that by everything logical we ought to refrain from the beautiful and satisfying operation of tonsillectomy, as a routine procedure in our clinics, until after puberty, unless for known disease.

Healthy, normal adenoid and tonsil tissue is formed at birth and before, increases for a stated time, and afterward shrinks and disappears just as does the thymus gland. The really ideal, normal child always has his tonsils, and, like all our organs, they do their work without our being conscious of them while they remain normal. This surely, then, suggests a certain stated function.

Apparently the first part of the ring of adenoid tissue in our throats to possess a function is the pharynx tonsil. Later, when dentition starts, the faucials show activity, and later still the lingual tonsil. When retrograde processes start the atrophy first shows in the adenoid, and later still the faucials start to shrink. At forty the lingual tonsil may be still active. This suggests that a certain amount of activity of this tissue is necessary all our life long for the proper well being of our bodies. Now, why should we thus ruthlessly remove, in childhood, all of that tissue which we can lay our hands upon, when all the logic of events is that some of it is surely needed? Have you not all of you contemplated how much this sometimes is when you have done a complete adenoidectomy and a pretty enucleation? It seems so satisfying, and one sort of pats himself on the back, as he contemplates how every bit of the tonsils is there, all within its capsule.

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It would seem logical that we cannot do this indefinitely to young children without some penalty, and I feel positive that in ten or fifteen years from now we will all know what it is that we have done. Without doubt some of the little folks from whom we have removed so much tissue are going to need more than they have left. Then we might expect early enlargement of the lingual tonsil, and the lateral columns of the pharynx will be found projecting into the throat, and no doubt by their clinical manifestations will give us still something to do when there are no more tonsils to enucleate.

Already, as a sign of the times, I might chronicle the fact that I have this year seen my first three cases of quinsy of the lateral columns of the pharynx. Each was a well defined abscess just above and behind the palate, and each of them was associated with profound systemic disturbance and marked and very threatening edema glottidis. In two of the patients only rudimentary tonsils existed, one having had two operations on his tonsils.

Living as I do in a small community, I see more of my successes and failures than do many of you in the larger cities, who never surely know very much of what happens to the hundreds and thousands of your clinic patients. The greater the city, the less you can follow even your private patients. For years I removed only adenoids in an attempt to study the problem, in children rarely doing even a radical tonsillotomy, unless the tonsils were either diseased or markedly obstructive. What has been the result? A varied one, as might have been expected. Some faucials enlarged; some did not. But some took better care of their throats and teeth. Some had better noses. Some did not need the tissue, and others did. Those who did, many of them, never had the slightest trouble from the tonsils which enlarged in response to needs of the system for tissue of that kind. The large, discrete tonsils were without symptoms. Only the adherent, sunken ones ever made any trouble. When the children got older the discrete, but sometimes too large, tonsils shrank away, and nothing ever happened. I have only a very few times, remarkably few, ever had the slightest reason to wish I had removed more: when I did the children were old enough so that a little shrinkage by ignipuncture was all that was necessary. And

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if this tonsil tissue was any protection, then they surely had all such advantages.

It might now be asked, when we suddenly remove these large amounts of adenoid tissue from our small patients, why don't we observe some bad results if this is so disastrous to them? This I have already said I believe will surely be chronicled, if all of us, in a perfectly judicial spirit, observe while we watch and wait. What the function of the tonsil is must soon be learned if all that we here have said has any bearing. It is rather suggestive, and I have often wondered if there is any connection between the frequently observed appendicitis in children who have had both tonsils and adenoids thoroughly removed. Both are certainly adenoid structures. Much more has been said about the appendix, also, since the arrival of grippe in our land. And here, too, I have wondered if the grippe is not also responsible for sending astray from the straight and narrow path of normal procedure many a tonsil and adenoid. Might they not have grown big from trying to defend our systems from the grippe inroads?

By thinking along all the various lines, I believe we shall be able to deduce, as I have said before, something interesting and instructive.

In conclusion I want to commend the following thoughts as being perhaps more applicable to the younger generation who are to follow us to the front ranks of the workers in this line of activity.

First, that logically tonsil tissue must have a function, and if so, it is to the young that it is of most value.

Second, if it is necessary to operate in children upon the faucial tonsils, which are merely large and not diseased, then there are surely perfectly safe, sane and effective methods other than complete tonsillectomy to deal with the problem. Be thorough with the adenoids, but save some healthy tonsil tissue.

Third, while what has just preceded may apply perfectly well to adults, in them the evidences of disease may be so apparent that radical procedure against the tonsil is surely justifiable; and then, by all means, do a tonsillectomy, in any one of the admirable ways which you gentlemen have been so prominently identified in developing to a perfect detail.

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Discussion on the Paper of Dr. Henry L. Swain.

Dr. J. E. Logan: I do not believe that healthy tonsils are a menace. Dr. Swain has presented this subject in a very lucid and interesting manner. It is time for us to decide some points regarding tonsils that to-day are in a serious state of unrest. It is expected that every child sent to us to-day by the general practitioner, presenting an obscure symptomatology, but possessing tonsils visible to the naked eye, shall have these glands removed without delay. I for one believe so much in the protection afforded by the tonsils in early life—up to the eighth or tenth year—that if they are not obstructive and are not the seat of pronounced inflammation they should not be removed.

In early life they should only be removed for the purpose of establishing free respiration. I prefer in these cases to remove the adenoid and allow the tonsils to remain if possible until after the tenth year.

When the operation is to be done it should be done radically, leaving just as little glandular structure as possible in either the fauces or the vault.

Dr. Swain is to be commended most highly on this interesting paper.

Dr. J. G. Wilson: I have listened with great pleasure to Dr. Swain's paper. A correct recognition of the role played by the palatine tonsil as a protection for, or as a menace to, the human organism is of fundamental importance to the laryngologist. Such a recognition demands an adequate conception of its physiological significance.

There appears to be good ground for the belief, as Dr. Swain has said, that the physiological activity of the tonsil is of greatest importance in infant life. This belief is principally based on the fact that the tonsil appears early in embryonic life (4th month), reaches maturity at the end of the first year of infancy, and at or about puberty tends to diminish in size. In the adult the verticular tissue and follicles are more or less atrophied.

On one point I would emphatically differ from Dr. Swain, namely, that the tonsil is to be regarded as a lymphatic gland. It is just this presumption that has led many to a hasty and an unnecessary enucleation. The argument that one frequently hears is that since the tonsil is only a lymphatic gland its activity can be readily replaced by other lymphatic structures. That lymphocytes develop in its adenoid tissue there can be no doubt. But is this its whole purpose or even its main function? In this connection I would point out:

1. That the tonsil does not develop like a lymphatic gland from

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a plexus of pre-existing lymph vessels in the mesothelium. It develops as an ingrowth of endothelium from the second branchial pouch and so in its origin comes into line with the thymus and the thyroid, for I need not remind you that the thymus originates from the third branchial pouch, the thyroid from the fourth, and the parathyroid from the third and fourth, all by inbudding of the endothelial lining of the primitive pharynx.

2. Comparative anatomy suggests from the varied relations which the tonsil shows to the pharynx that the tonsil secretes or excretes a substance into the pharynx. The palatine tonsil is present in all mammals (with one or two noteworthy exceptions, e. g., the rat), and its anatomical arrangement is such that no matter how it be concealed by folds of mucous membrane it always retains a communication with the pharynx. I have been much impressed with this fact from observations made in my laboratory during the past Winter, especially in the carnivora. In this genus the tonsil is often so protected by folds as to be invisible from the mouth, no doubt influenced by the character of the food devoured. But there always exists a channel of communication. This is well seen in the lion, where the tonsil lies in an elliptical sac of considerable size in the lateral pharyngeal wall, communicating with the pharynx by a relatively small opening. Of the walls of the sac the tonsil occupies but a portion of one side. The sac is so placed that during certain movements of the pharynx the contents can be expelled into the back of the mouth.

On these grounds, as well as others I shall not dwell upon, I have been led to believe that in the tonsil we have a structure which, in addition to being a center of development for lymphocytes, plays a role of importance in early life and which necessitates a close relation to the pharynx. What that role may be we have as yet no adequate knowledge. It may be one of inestimable value to the infant in his earliest days of life, but which as he grows through childhood into manhood he is able to dispense with.

Dr. George L. Richards: The question naturally comes up why have we changed from our former practice of performing tonsillotomy? For some reason because the results were insufficient, because what was left was a menace. A few years ago I canvassed pretty thoroughly a large number of men with reference to their opinions, and I see the names of two of them among our Corresponding and Honorary Fellows. One wrote me that he had always found tonsillotomy sufficient. Another said he had had to take out some of the tonsillar stumps left by the first. I asked in my paper, "have you reoperated after yourself or others?" Many had reoperated after others. Why? Because, as a rule, the patient goes to some one else for the second operation. We have

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come to the conclusion that tonsillectomy is indicated because tonsillotomy is insufficient. Peritonsillar abscesses have followed the latter operation.

I do not believe in taking out every tonsil, but whenever there is any reason to believe that the tonsil is a menace to the organism I see no reason for leaving any of it, for the very reason that it has never been proven that the taking of it out in a proper manner has been an injury to the individual from its loss.

Dr. C. R. Holmes: I have now practiced for twenty-five years, and for twenty-two years of that time I did the partial operation. For three years past I have practiced the radical operation for the same reason expressed before, that the partial one was not satisfactory in a large percentage of cases. What we are after, all theory aside, are results, and it is only by getting results that we have the right to adopt one method over another. Did we always get the results the other way, and if we did why did we change? The answer is that we did not. Do we get results by the radical method? I have. I have yet to see a single case where I have to regret doing a complete tonsillectomy.

I agree with Dr. Casselberry and with Dr. Swain that we should not remove the tonsils unless they are diseased. In young children I put it off as long as possible, but when we have recurring attacks, otitis and a fever, there is something making trouble there, and when you know that by removing the tonsils you are not likely to have these things, are you not justified in doing a tonsillectomy?

A careful examination made when removing adenoids will usually show disease of the tonsils.

Dr. W. K. Simpson: I wish all the members of the association could have been here to hear this symposium on the tonsil, because I think it is one step in the adjustment of this question.

Dr. Makuen has shown the accidents which have happened.

Dr. Getchell has injected a little conservatism relative to the tonsils being a tremendous portal of infection. Also in his paper he spoke of the twelve deaths in Boston following operation.

These all point to the great question that must have come up years ago, why this radical operation continued. There must be some reason, and I hope the time will soon come when the whole thing will be properly adjusted.

With regard to the tonsil being a portal of infection, I think that too much attention has been given this point, for the element of coincidence comes so often. Personally, I have seen very few cases of rheumatism associated with tonsillitis. I have seen very few general systemic conditions associated with tonsillitis. We must not forget the other portals open to infection, the naso-

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pharynx and the lingual tonsil. As Dr. Thrasher points out, it is not a case of removing the tonsil and you will never have an extragenital chancre. If the tonsil is removed some other portion of the throat is affected.

I always like to refer to the article by Dr. Louis Frissell, of New York, who has written on the relation of rheumatism to tonsils, and I consider his paper to be classical.

Dr. Arthur A. Bliss: One of the speakers referred to the uncertainty of opinions regarding tonsillectomy. It seems to me that the uncertainty in this matter is not with the men who are doing the radical work. Almost every advocate of this operation speaks of the satisfactory results.

I believe the tonsil becomes a menace to health very often after its partial removal, and there are many dangers attending partial removal.

Most of us, I think, can judge whether the tonsil is diseased or not to the extent for interference, and if so I believe it should be completely removed. To take out a portion of it and allow the tonsil's cut surface to be partly covered with fibrous tissue only leads to subsequent infections and serious inflammation, often peritonsillar abscess.

There is one class of patients I think we should think of especially. I mean the public school children. In this city all school children are examined by a medical man in the school and referred to the specialist whom he thinks essential; I have many sent to me at the hospital because of their tonsillar condition. A great many of them are healthy, well developed, normal children, although they have large tonsils and adenoids. I fear that there is a tendency not to give these children the protection we would give to those in our private practice, for, oftentimes, we must hurry through their examination, and it is easier to operate than to explain why we do not wish to do so, and why it is wiser to delay and watch the patient for developments of symptoms that do not exist now, and may never exist. Yet this class of cases is deserving of special attention on this score.

Dr. W. E. Casselberry: Dr. Wilson's information on the different embryological development of the tonsils from ordinary lymphatic glands in that their primary structural development is in common with the thyroid gland rather than with lymphnoses is new to me and illuminating, considered in conjunction with clinical facts. I never have doubted that the tonsil had a function, but I have never seen a particle of detriment to the child or adult resulting from its total excision. I believe there would be detriment, however, if there were not supplementary tonsil tissues to take its place.

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I agree thoroughly with the position of Dr. Swain, that in the young child up to a certain age, considering that the function of the tonsils is more active in childhood as evidenced, that if not definitely diseased or obstructive the tonsils should be left undisturbed. The only trouble with this doctrine is that as a matter of fact as we see them in this generation they nearly always are diseased, or obstructive, or subject to recurrent damaging acute infections. But there are rare cases, no doubt, where the tonsils are deliberately sacrificed without good reason, so the position formulated by the essayist appeals to one as rational, although it instantly suggests the question: What shall constitute disease of a degree to render tonsillectomy the wisest course? Thus, again we reach the same situation, to be met only by the exercise of individual judgment. Although expressed with varying emphasis, I have not heard in this discussion much difference of opinion, all speakers having said to operate only when the tonsils are diseased and nearly all having favored tonsillectomy rather than tonsillotomy. Exceptionally, I do not doubt that they all substitute, also on occasion, as I do, other operative expedients, such as excision alone of the velar lobe, slitting of the follicles and freeing of the tonsil from the plica, any one of which may prove adequate in selected cases.

Dr. George B. Wood: Much as I am interested in the paper read by Dr. Swain there are several things in it with which I cannot agree. An accurate knowledge of the lymph supply of the tonsil is most important for the laryngologist. Though one author has claimed to have succeeded by injecting the tissues of the nose of certain animals during life in getting minute foreign particles to pass via the lymph vessels into the tonsil, I personally do not believe there is any great afferent lymph current to the tonsils. There is, however, a distinct efferent lymph current. The crypts of the tonsil pass to its base, terminating beneath the capsule and they ramify in different directions, leaving only a thin partition of tonsillar tissue between the crypt and the fibrous trabeculae. In the trabeculae can be seen lymph spaces which are usually filled with lymphocytes coming from the fonsil parenchyma. A number of observers have demonstrated the existence of a distinct current in the interfollicular substance of the tonsil leading from the epithelium of the tonsillar crypt towards the trabeculae and out into the efferent lymph vessels. It has been shown experimentally that it is possible for the tubercle bacillus, to follow this route into the cervical lymph nodes and with an extreme dosage of virulent tubercle bacillus smeared on the surface of the tonsil of the hog it was

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possible to find this bacillus in the cervical lymphatics before any disease of the tonsil had become manifest.

The tonsil, however, in these series of experiments sooner or later invariably became affected, but the disease in the tonsil was of a much slower developing type than that in the lymph nodes. In other words it is possible to have a latent tuberculosis of the tonsil causing actively progressing lesions in the lymph nodes.

I want to protest against the indiscriminate use of the term "diseased tonsil." Except for certain acute, well marked pathologic lesions, it is impossible clinically to determine the exact condition of the tonsil paranchyma. Tonsils which appeared to be diseased were found microscopically to consist of normal tissue and on the other hand I have taken out tonsils clinically innocent and found various suppurative lesions or perhaps tuberculosis in the deeper layers of the tonsils. It appears to me that one of the hardest problems with which the laryngologist has to deal is to pass judgment upon the conditions of the tonsillar tissue of the throat in certain cases of suspected or doubtful disease.

Concerning the functions of the tonsils there has been a great deal of guesswork indulged in, and the only physiologic property which they have been proven to possess is the production of lymphocytes in the germ centres or follicles. The production of lymphocytes in these centres is shown by the presence of numerous mitotic figures, a condition similar to that found in other lymphatic tissue. Therefore the removal of tonsils from an individual after the first two or three years of life removes only a very small fraction of the normal supply of lymphocytes. I have never seen a case in which the absence of the tonsillar tissue was harmful to the individual. The deformity following an unskilful operation occasionally is followed by more or less unpleasant sensations, and sometimes the shock of the operation or a hemorrhage may cause the patient more or less upset for some time following.

I at present believe in the complete enucleation of the tonsil. Up to three years ago I thought differently. During these last three years so many of my former patients have come back with tonsillitis occurring in the stumps left or other disagreeable consequences, that I was forced into doing the complete removal with the capsule. On the other hand I have never seen a case in which I regretted the complete enucleation of the tonsil.

Dr. Mackenzie: I have talked on this subject before this Association on a former occasion (Transactions 1907, pp. 237-240), and I will not therefore repeat what was then said. I wish today, however, to again enter a formal protest against the indis-

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criminate removal of the tonsils, especially the so-called "complete" operation, which, above all others, is the chief and most glaring abuse in the laryngology of to-day. Of all the surgical crazes, not excluding appendix operations, it is the most insane. We are going through to-day in laryngology what the gynaecologist went through years ago. The ovaries were removed then under as little provocation as the tonsils are being taken out to-day. The so-called "tonsil question" is one of simplicity and comparatively small dimensions when viewed in the light of sanity and common sense; but it has been made to assume formidable proportions by unsound observation and reckless surgery. It has come to a point where it is not only a burning question to the profession, but also to the public. This senseless, ruthless destruction of the tonsil is so far-reaching and enduring in its evil results that it is becoming each day a greater menace to the public health, and therefore to the public safety. Until we have more definite knowledge concerning the uses of the tonsil, no one can foresee the damage done to the children of the present generation or the influence of wholesale tonsil removal on the children of the next. Whatever a more exact examination of the tonsil may reveal as to its formations, I believe that it was placed in the throat not with evil, but with good intent—to serve aeteological rather than a pathological purpose—that its mission is physiological and that it was not designed by nature as a natural, convenient and easy means of infection. It is, of course, not open to debate that there are a multitude of conditions that call for partial destruction or more or less complete removal of the tonsils; but radical operation should not be done without definite and sufficient reason. The tonsil should not be sacrificed any more than any other organ, without convincing evidence that it is the cause of the disease to be removed. Hasty theory, which sees in destruction of the tonsil the only means of treatment, and which, unmindful of the lymphatic and other anatomical arrangement of the neighboring structure and their physiology, and which, losing sight of the further fact that it is hard, if not impossible, to determine during life that the tonsil is the only avenue of entrance, in a given infection, throws differential diagnosis to the winds, should have no place in modern scientific laryngology.

When we shall clarify the atmosphere of our ideas on this matter and when sane authority shall demand a halt, then we will hear less of the massacre of innocent organs and have less frenzied literature on this subject.

Dr. J. F. Barnhill: It seems to me that we lose sight of certain features that this paper is intended to bring out. Is the

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tonsil a menace? The same question may be asked of the leg, or the eye. The leg does sometimes become a menace, when there is no question regarding the propriety of its removal. The question of the indiscriminate removal of the tonsils is a good one, but the question as to whether when removing the tonsils it should be done completely or not, seems, in the face of the results obtained, not to need further discussion. The essayist quoted some things said at our Boston meeting, and one of these quotations made an impression on me, namely, the one in which it was said that we ought to leave some of this grandular tissue when operating. Almost immediately after my return home from that meeting I did three such operations, in all of which we had tonsillitis and quinzy to the extent that I later had to remove the remaining tissue.

The tonsil is always a menace when it is diseased. You must determine whether or not it is diseased; if not you must not touch it in an operative way, but if diseased we ought to do as the Bible recommends for the offending eye—pluck it out.

Dr. C. W. Richardson: I have found, as no doubt has been the experience of you all, that the internist is sending us a great many cases to be operated on. They send us what they think diseased tonsils. Tonsils that they state are tuberculous, that are causing rheumatism, that are causing endocarditis and various other joint lesions. I have been unable in many of these cases to recognize any diseased condition in the tonsil. I have had three or four cases of tuberculous tonsils sent to me, that is tuberculous from the general practitioner's point of view. I have been able to find no tuberculous lesion in any of these cases. I have refused to excise them because they were too small to be considered. Yet they have gone into the hands of other men who have recognized immediately the tuberculosis lesion in the tonsil and have excised them. The same way with other conditions. Now age and experience do not count for much, but we who have practiced in this speciality for fifteen or twenty years ought to be able to recognize grave pathological lesions in tonsils better than men who have practiced only two or three years. They are the class of men that are constantly discovering serious organic lesions in tonsils which show no local changes, and are removing all tonsils because they are diseased. In fact, in my locality there are several men who say that a child should not possess a tonsil, that the mere existence of one is an abnormality and it should be removed. I have heard it stated that tonsils will contain bacilli of tuberculosis which will be carried through it into the general system and cause infection without any local manifestation in the tonsil. Are we

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going to remove all tonsils that come along simply because some man states that that tonsil is probably harboring tubercle bacilli, on macroscopical not misroscopical inspection, not because he has seen the bacilli in the tonsil? I say no. There is another side to this question and it is an important side. Even admitting that rheumatism, endocarditis, tuberculosis and other conditions may be engrafted on the general constitution by the presence of tonsils, and that probably by their removal these conditions can be prevented, should we go ahead and remove these tonsils and run the risk of killing some of our patients just on this supposition? We engraft other conditions on them than those from which they are to be relieved. I have had emphysema to occur after tonsillotomy. One case of emphysema was followed by a hemorrhagic or septic infarct that caused a great deal of suffering and long sickness to a man, and one in no humble sphere. I have seen pneumonia follow, and I lost one case in which the tonsils were removed for rheumatism. I have seen pleurisy, and I have one interesting case which was quite similar to one Dr. Wishart has described, and one reported by Dr. F. R. Packard, in which I operated on a child with a temperature of 99°; this was the only time I ever operated on a child with a temperature. I operated about 1 o'clock, at 3 the temperature was 102°, between 4 and 5 it was 103°, between 5 and 6 it was 105°, and before the child died it went to 107.5°, the patient dying at 11:30. I was particularly interested in this case because I had read Dr. Wishart's report, and I had a most careful post-mortem made by one of the most experienced pathologists in Washington, and there was not a single lesion to be found. No blood in the stomach or intestinal tract, therefore not due to any fault in operation. When Dr. Glazebrook got through the post-mortem and we went over everything, he turned and said, "What are you going to give as the cause of death?" I replied, "You are the Coroner's physician and must make the diagnosis." We could not find a single lesion in that child.

These are but a few of the causes of death. There are lots of deaths that men are not frank enough to admit and report.

I do a great many tonsillectomies, am always doing them, but I think we must look this question frankly in the face and in each individual case ask ourselves if the patient's condition is serious enough to warrant putting him under a general anesthetic and doing an operation which may endanger his life.

Dr. B. B. Shurly: The medical profession at large certainly looks to a special body of this kind to give it some definite information as to just what their procedure should be in regard to tonsils. We have talked about them these many years, and

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yet we are leaving this subject with the widest discrepancies of statement in regard to whether the tonsil is a menace or a protection. It seems as if we ought to get this subject on a definite basis. The American Pediatric Society many years ago established a collective investigation in regard to antitoxin, which brought before the profession at large a definite amount of information, enormous in volume, and of inestimable therapeutic value to the profession throughout the world, as to whether antitoxin was the proper thing, and how much should be considered a proper dose. It seems to me that men who have practiced our specialty removing tonsils in toto for a series of five or ten years should be able to state definitely and absolutely to the profession at large the result of their work. Take for instance the point brought by Dr. Wilson to-day: The rat has no tonsil. It may therefore be taken by some that the rat has no tonsillar or other rheumatism. So perhaps if we could boil down a few of these facts and condense the matter we might have something definite to show for the enormous amount of work done throughout the country.

I never operate on children under two years of age unless the tonsils are shown to be diseased. In many hundred tonsillectomies I am able to find nothing but the most favorable results. When infectious disease supervenes they are better off; laryngeal diphtheria, for example, is not so frequent a complication.

Dr. Algernon Coolidge, Jr.: In discussing the pathology of the tonsil, or even the question of its physiology, anything is of interest which may possibly throw light on the etiology of acute tonsillitis. We have recently had an epidemic in Boston in which the most pronounced symptom was acute tonsillitis. There had been a rumor that an epidemic of tonsillitis prevailed in the central part of the State. Suddenly in a section of Boston and in two adjoining suburban districts several cases, probably a few hundred occurred within a day or two. These cases appeared in certain scattered households only, but in some of these houses from 50 to 100 per cent of the inmates were stricken at the same time. The victims of this outburst were in most instances known to have taken milk from the same milk supply, the source of which was situated on the border of the district into which the epidemic was advancing. Later cases occurred more widely scattered, independent of any evident source of infection. The attack of tonsillitis was often severe and prolonged, in several cases accompanied by, or followed by, septic processes in other parts of the body. Peritonsillar abscess and cervical adenitis were unusually frequent complications, intestinal symptoms were sometimes present, and occasionally

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peritonitis or other severe and even fatal sepsis. The disease did not seem to be contagious, but in all probability to have been introduced through the food supply. An attack did not start from a septic focus in the throat, but as is commonly the case by a constitutional disturbance, after which the whole tonsillar ring burst into flame at once. It is interesting to note that patients whose tonsils had been removed did not escape the process in the remaining lymphoid tissue, the constitutional symptoms nor even the cervical adenitis. Nothing definite, as far as I have been able to learn, was discovered by bacteriological study, but the virulence of the organism was shown in several cases. The period of incubation appeared to be about two days. Fraenkel first pointed out that septic nasal cavities may be the source of acute tonsillitis. This epidemic seems to show that the disease may gain entrance through the digestive tract. In typical cases the whole ring of lymphoid tissue, including the faucial tonsils, lights up at once, after constitutional symptoms have appeared, suggesting that the tonsillar outbreak is secondary to some constitutional process and that the infecting agent is brought to the tonsils from within.

Dr. D. Braden Kyle: I saw a patient in the hospital who met with an accident some three or four years ago in which he lost his nose. He was a hayfever subject, but he had not lost his hayfever. Nor will we lose the liability to disease by taking out the tonsil. The lymphatic ring on the pharynx is a breakwater of the system. Do not blame every red spot in the lymphatic ring as something going in; it works the other way and you will find in 60 to 70% that it is dependent on some systemic condition. What good then will it do to lacerate and tear out the tonsil? The tonsil may be swollen; I have seen them enlarged in patients as big as walnuts; loosen it, do not cut the connective tissue in the soft palate or the anterior or posterior pillars, and you will have no scar tissue, and after reducing the adhesions the size of the tonsil will decrease.

In regard to this question of tonsils it seems to me there are several points to be considered. In the first place, the age of the patient; there is a vast difference in the tonsil before and after puberty. In the second place, the man who is looking at the tonsil. Diagnosis is the whole solution. You must know what is back of the condition, and if the child is under the age of puberty and has symptoms, be sure it is a local and not a systemic condition before doing a tonsillectomy. I could show you cases where there is not a speck of tonsillar tissue in the throat, yet the patient has as bad sore throat as before tonsillectomy. You must take into consideration the general con-

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dition of the individual and that individual himself. You cannot lay down fixed rules for operating on tonsils. If the fault is with the individual, removing all the tonsils would not solve the difficulty.

Dr. D. Bryson Delavan: The removal of the tonsils was probably one of the earliest operations known to man. Galen advocated the method of enucleation, probably having learned it from sources which far antedated his own time. For many generations this method was abandoned by men undoubtedly aware of its existence who were careful observers and distinguished operators. Its revival, therefore, is to be received with some caution, inasmuch as there was probably some good reason for its abandonment. In the second place, it is impossible to discuss all of the phases of a given condition upon the basis of one. Thus, in the matter of hemorrhage after tonsillotomy, one man describes a moderate bleeding from a small vessel, easily checked by the application of almost anything, while another finds himself confronted with a case in which the life of the patient is in imminent jeopardy from what in reality is a hemorrhage of startling proportion. The means successful in the first variety have time and again proved worse than useless in the second. It is impossible, therefore, to discuss the one type of bleeding upon the basis of the other. (I have already published an exhaustive article on the subject in the first edition of "A Reference Handbook of the Medical Sciences," published by William Wood & Co.)

So it is in operative work upon the tonsils and upon many other parts of the body in general. What might be the proper line of treatment for one variety of tonsil would not necessarily be proper for another. It is highly necessary that first of all different conditions shall be recognized and then that each shall be treated as demanded by its own peculiarities.

The successful application of any general rule of treatment for all forms of tonsillar disease is, therefore, impracticable. I have heard some practitioners say that they considered every tonsil which was at all in evidence to be diseased, and therefore worthy of removal. I regard this position as unsafe, and believe that the more experience an observer has had in the study of the tonsil the less liable he will be to advocate such wholesale destruction of it, operating of course when necessary, but recognizing that certain cases require operation and that others are better treated by other means. In the third place the custom of regarding operations upon the lymphoid elements of the throat as simple and requiring little or no experience or knowledge is unfortunately widely prevalent. Practitioners of

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all kinds consider themselves competent to operate upon any case of that kind which comes before them, and even eminent specialists in other departments, especially in pediatrics and gynecology, do not hesitate to assume the care of such cases, many of them apparently showing little discrimination, but operating whenever the opportunity offers.

Surely the opinions of those who spend their lives in the study of diseases of the throat and who by diligent work have gained much experience should be of some value in the settlement of this question.

So far as my acquaintance extends among the best specialists of the day I do not know of one who would not be willing to substantiate most of the views brought forward in the papers to which we have listened. I regard it as highly desirable that the widespread misapprehensions upon the subject at present existing should be corrected by just such careful scientific presentation of it to the medical world.

Dr. C. G. Coakley: We do have tonsils that are protective and those that are a menace. The laryngologists have been severely criticised by the pathologist because of the indiscriminate removal of this gland. There is no question that we have seen very bad results. I have seen a number of cases in which the tonsils were re-enucleated. The trouble is not all in the tonsils. You must remove all lymphatic chains in the neighborhood.

First of all we must consider the individual making the examination. The ability to say whether or not a certain tonsil is acting as a menace or not comes only with experience from seeing cases. It is always difficult to look at the tonsil and say whether or not it is diseased, but if a child under ten years of age has not had sore throat, does not have an embedded tonsil, has no earache, very little adenoid tissue, but a perfectly huge tonsil as large as a walnut, is in good general health, that certainly is not a case of diseased tonsil, nor is the organ in this instance a menace. As Dr. Swain truly says, and any practitioner of twenty-five years has seen, a tonsil in a child under ten years is not to be compared to one in an adult, for they are totally different organs. In adult life it is classed more as a pathological than as a physiological organ.

Dr. L. A. Coffin: I am glad to hear Dr. Wood say that it is impossible to tell by looking at a tonsil whether or not it is diseased. We have all had this experience. I have removed tonsils because the patients insisted, though for myself I did not consider them diseased; have incised down to the capsule, and in several of these cases have seen fluid pus flow out. I have recently, too, had a sad experience from tonsillitis. A member of

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my own family contracted tonsillitis; throat condition not clearing up satisfactorily, I dissected up into the supra-tonsilar fossa. There was a considerable collection of pus. Acute nephritis developed, which kept the patient in bed for three months. Several similar cases have lately come to my notice.

I think some of the worst tonsils are those which are but the stumps remaining from previous operation, in which inflammatory conditions set up adhesions which cause endless trouble. I believe if we touch the tonsil at all we should take it out root and branch, if possible.

It must also be remembered that the tonsil excretes as well as absorbs.

As to whether the tonsil is a protection, I have no evidence to offer. I think there is no question that in a certain number of cases diseased tonsils produce a condition which, for lack of a better name, is grouped under the heading "rheumatism," and I think you can all recall cases with rheumatic diatheses that show the abeyance of these peculiar manifestations on the thorough removal of the tonsil.

At a recent discussion in New York Dr. Curry said that he would much rather carry a child through any of the infectious diseases who had had the tonsils completely removed at a previous time, than one with tonsils; that there were far fewer complications. So far as he could say he had known of no function that the tonsil maintained, and considered that every child would be better off without tonsils than with them. I do not, of course, advocate quite as radical a view as this. There is, however, one thing we must bear in mind, and that is I have been impressed with the fact that these children who have diseased tonsils and adenoids when these organs have been thoroughly removed, grow perfectly well, strong and healthy. I believe the tonsil should be enucleated and not cut off. The fact that later on the patient has a pharyngitis or has the posterior pillar involved is no argument, in my mind, against the enucleation of the tonsil.

Dr. Henry L. Swain (in closing): I did not in my paper, nor can I now say as much as I would like about the admirable work of Dr. Wood. There is such a thing as local immunity. It is the result of a certain equilibrium, which in the case of the nose is easily upset, as was shown by Dr. Coolidge in this discussion yesterday. Only when so disturbed does the general immunity have a chance to play its part as the germs get in beneath the surface. The objection which I have to the experiments of Dr. Wood is that they do not imitate natural conditions, even when he now much more gently than in his first animals places a lot

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of tubercle bacilli directly into the crypts of the tonsils. Here the epithelial cells are overwhelmed with a very much greater number of living bacilli than presumably could ever come to these same cells in a human being. Certainly the local equilibrium is upset and the local immunity of that area destroyed. He has proved the point that under such conditions tubercle bacilli can be made to enter a tonsil, but how different is this from the stray bacillus or two at a time which we take in during our ingestion of food, or by drinking of milk, or by the air we breathe. For ages past we have been developing a tonsillar epithelium able to protect our systems against infection through the surface, but we do not get a large absorption of living matter in that way, and particularly of tubercle bacilli, unless the patients are already victims of tuberculosis of the lungs or other areas. When infection of any kind does take place through the tonsillar surface there is either a disturbance of the general system, or matter comes down from the nose, or from the other afferent lymphatics into the tonsillar tissue, and then within the substance of the tonsil works certain changes in the surface tension (as for example, modification of the cholesterin content as shown by Jonathan Wright) of the epithelial cells, and then, and then only, perhaps, do the germs pass the living but not alert epithelial cells. The equilibrium is destroyed from within, not from the surface.

As I have said in my paper, I believe that the tubercle bacilli which we find in removed tonsils often, if not always, find their way by the afferent lymphatic route from the nose, teeth and buccal cavity, and not by soaking in through the surface.

I wish I might reply to Dr. Wilson and all of you who have spoken so nicely this afternoon. It is just such conditions as have been referred to by Dr. Logan, where cases are sent to us demanding that a tonsillectomy be done whether we personally approve of it or not, which I have tried to properly discuss. In the public schools, for example, a nurse goes around, sees a high arch palate which she thinks means adenoids, and promptly sends in this child to the hospital or clinic, not only for removal of the adenoids, but also for the removal of the tonsils. Sometimes, I regret to say, in order to get rid of the mass of clinical material we carelessly go ahead and do the operations, and this is one of the things that I am trying to strongly contend in this paper as being absolutely wrong, the routine habit of taking out the tonsils whenever a child is anesthetized for any cause, it being commonly said that as long as he is under the anesthetic, why not take out his tonsils? This, as I have said, I cannot condemn too strongly, especially in the young child, because in these days

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the habit is growing so general to enucleate the tonsil if we operate upon it at all. In the older days when we merely did a simple tonsillotomy it was not such a serious question. There was enough of the tonsil left to perform function, and we did not mutilate the pillars of the palate or run the risks which the enucleation involves.

I would like to amend Dr. Shurly's plea when he said, "Take a thousand cases and observe absolutely what is the result," by saying, remove from a thousand patients the adenoids just as thoroughly as you can, but either let the tonsils be as they are or remove only the amount which is obstructive, and compare this with a thousand cases, if you will, where the adenoids and tonsils were both removed (enucleated), and I think the life history of the first set of cases will compare very favorably with the second, where both have grown to maturity.

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INJECTIONS OF BLOOD SERUM FOR HEMORRHAGE EITHER SPONTANEOUS OR POST-OPERATIVE.

BY CLEMENT F. THEISEN, M.D.

Hemorrhage after tonsillectomy is always unpleasant, and when it becomes so severe as to endanger the life of the patient there are very few other complications so alarming, and which so tax the resources of the operator.

The following cases are reported to show the probable value of injections of blood serum when other methods fail, or when the patient is so reduced from the loss of blood, that the administration of another anesthetic for the purpose of suturing the pillars in tonsillar hemorrhages, does not seem advisable,

Case 1. Boy, aged 6 years. Removal of tonsils and adenoids. The tonsils were removed by dissection and snare, the method employed by most operators at the present time, and the adenoids in the usual way.

There was very little bleeding during the operation and when it was completed, firmly rolled cotton tampons just filling the tonsillar fossa, were pressed firmly into the cavities and held there for a few moments. This stopped the oozing of blood promptly, and, in fact, during the past fifteen years, since this procedure has been employed by the writer, it has rarely failed to check all immediate hemorrhage, and probably prevents secondary hemorrhage. The cotton tampons can be either used dry or may be dipped in pure peroxide.

The operation was performed in the morning, and there was apparently no bleeding during the day, but in the early evening the boy vomited an enormous amount of clotted blood, followed by a fresh hemorrhage.

The boy was so hard to manage and in such a bad general condition that it was difficult to determine where the hemorrhage came from. But after the exercise of a good deal of persuasion

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and tact, a fairly good view of the throat was obtained and the bleeding appeared to come from a point low down in the right tonsillar fossa. Pressure with the finger wrapped with gauze, and with cotton tampons soaked in peroxide and adrenalin, was used, and after a time the hemorrhage stopped. No spurting vessel could be seen. During the night the writer was again called for another alarming hemorrhage. The nurse saved the blood, which again filled a large basin. While pressure was again employed, the patient was given 5,000 units of diphtheria antitoxin, the normal blood serum not being at hand, and this was repeated in two hours.

After the first injection the hemorrhage appreciably lessened, and after the second stopped completely. Two more injections of the same amount of antitoxin were used, however, and there was no return of the bleeding.

This may have been a case of haemophilia, because on questioning the mother, who was a rather ignorant woman, she said that there had been other cases of severe hemorrhage in the family after extraction of teeth and other trivial wounds. The boy made a good recovery.

Case 2. Mr. P. D., lawyer, aged 44 years. Has occasionally been under treatment for slight attacks of acute pharyngitis. His tonsils are slightly enlarged. On the 18th of January he came to the office suffering from one of his usual attacks. This attack differed from the others as the tonsils were also slightly inflamed. He was given a simple astringent gargle, and was told to return to the office if the throat did not clear up. I did not hear from him after his visit to the office, but on the fifth day after that, his family physician asked me to come to the patient's home as soon as possible.

The patient was sitting up in bed breathing with great difficulty. On examining the throat the entire pharynx, soft palate uvula, tonsils, pillars and, in fact, everything that could be seen, was so tremendously oedematous that very little air was able to reach the larynx.

With the exception of a few small spots on the tonsils there was no deposit anywhere. Free incisions were made in 3 or 4 parts of the oedematous area and a considerable amount of serum escaped, but no pus.

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There was a good deal of infiltration of the tissues of the neck, and on the following day there was a boardlike infiltration of the entire neck, with a good deal of swelling.

The difficulty in breathing, which had been slightly relieved by the incisions on the preceding day, was as bad as ever, and on inspection of the throat the oedema was just as great. All the tissues were so tremendously distended that they looked like an inflated toy balloon. Four free incisions, as low down the pharynx as possible, were made again, with another free discharge of serum, but no pus and little bleeding. An ice bag was kept around the neck, cracked ice was used in the mouth and an iced adrenalin spray fairly continuously. The incisions again relieved the breathing to a considerable extent.

About an hour after getting back to my office I was told to come again immediately as the patient was having a severe hemorrhage from the throat. I was shown a large basin full of blood, and within ten minutes, after coughing slightly, he lost fully as much more.

An examination of the throat was made as soon as possible, but the origin of the hemorrhage could not be determined. There was no blood coming from the incisions at the time.

The patient was immediately given 10,000 units of antitoxin, and the following morning 20 cc. of antistreptococcic serum was injected, as cultures taken after the incisions were made showed almost a pure streptococcic infection. From this time on there was no further bleeding. The great oedema of the pharynx persisted for nearly two weeks, in spite of almost daily incisions. At no time was there any pus obtained. The oedema of the pharynx, as well as the infiltration of the tissues of the neck, slowly subsided, but it was nearly two months before the patient was strong enough to get up. Albumin and casts had been almost constantly present in the urine, and for a month the patient ran an evening temperature from 100 to 103.

So far as the writer is concerned, this was a somewhat unique throat condition and must be similar to the severe pelvic oedemas sometimes complicating streptococcic infections. The boardlike infiltration of the neck suggested Ludwig's Angina, but at no time did the condition go on to suppuration, nor was there any involve-

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ment of the floor of the mouth. A tracheotomy did not have to be performed, although for two weeks during the height of the attack the necessary instruments were at hand every day.

Case 3. The writer was called three weeks ago to see a woman, aged 50 years, who had been having a nasal hemorrhage lasting, with few intermissions, almost the entire preceding night.

The family physician had inserted a tampon, but the hemorrhage had not been controlled. The tampon was carefully removed, but the hemorrhage was so profuse that the bleeding point could not be located. Another tampon soaked in adrenalin was inserted, but did not check the hemorrhage. The patient by this time had lost a large amount of blood, and, as soon as it could be secured, was given an injection of 10 cc. normal blood serum (horse). This was given late in the afternoon, and within a short time the bleeding lessened.

Another injection of 10 cc. was given during the night, with removal of the tampon.

I do not think there is any doubt that the serum had a prompt effect in this case. The hemorrhage was certainly not controlled by packing and other usual procedures.

Case 4. Boy, aged 8 years. Had a severe acute tonsillitis followed by an acute suppurative otitis media. The boy's parents lived in the country and did not pay any attention to the ear condition, allowing it to go on for several weeks.

A physician was then called to see him from Albany, and sent him to the Child's hospital, where he was seen by the writer. The boy was in extremely bad general condition, with an extensive mastoid involvement on the left side. His throat was still congested and there was a profuse discharge of pus from the left ear. Temperature 104 degrees F. After being admitted to the hospital the boy had a chill and vomited. The mother stated that he had been having sweats and chills with fever every night for two weeks and some vomiting.

A mastoid operation was performed the morning after he was admitted to the hospital, and while the boy had an epidural abscess and involvement of the entire mastoid process the lateral

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sinus was uncovered and seemed to be normal. Blood count before operation showed a leucocytosis of 15,000.

The mastoid wound was left open, that is a good part of it, and on the following day the boy's condition had greatly improved. He did not vomit again, and, with the exception of a slight chill after the operation, his chills and sweats also stopped.

Temperature dropped to 100 degrees F., and his condition improved in every way, but on the third day a severe hematuria commenced, which increased to such an extent that the urine contained a large amount of blood each time. He was put on a diet, but became so weakened from loss of blood that we decided to try injections of serum. Antitoxin was used, 5,000 units being given each time. After the third injection the urine commenced to clear, and after the fourth the bleeding stopped entirely and did not return.

The boy also made an uninterrupted recovery so far as the mastoid condition is concerned.

He remained in the hospital four weeks, and I heard recently (six months after) that he was entirely well.

The question of hemorrhage after tonsillectomy is a particularly interesting one, and is receiving more attention since the radical operation has been performed.

Most men are agreed now that we really see fewer serious hemorrhages after tonsillectomy than we used to after tonsillotomy.

There are a few points which are probably not new, but which have come to the writer's attention in tonsil operations.

After an apparently complete tonsillectomy, a small mass of tissue is sometimes seen low down in the tonsillar fossa at the extreme base of the tonsil. This is entirely fibrous tissue and does no harm if left; in fact, it is wiser to leave it, because in the writer's experience some post-operative hemorrhages result if attempts are made to completely remove this.

Weil (Quoted by Class).

(Serum-Therapy in Purpura Hemorrhagica. The Archives of Internal Medicine. Vol. 6, No. 2, August 1910), whose researches in hemophilia were so largely responsible for the present status of serum therapy in this disease, reported in 1907, a series of four cases of hemorrhage from different sources treated with serum.

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The only case of interest in connection with the writer's paper, was one of febrile poly-arthritis with rapidly developing subcutaneous hemorrhages, epistaxis and hematuria.

Patient was treated with intravenous injections of 15 cc. of fresh beef serum and after one mild relapse was discharged cured.

In conclusion, the writer believes that injections of blood serum for either spontaneous or post-operative hemorrhage appear to be of the greatest value.

The control of hemorrhage after the use of serum cannot be regarded as a mere coincidence, because this method succeeds where the usual methods for control of hemorrhage sometimes fail.

In a personal communication Dr. Birkett gave me the brief notes of a case of violent hemorrhage from the nose of a woman aged 65 years, which was entirely controlled by the use of 20 cc. of normal blood serum.

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PRESENTATION OF A PATIENT FROM WHOSE TRACHEA AN OPEN SAFETY-PIN WAS REMOVED BY UPPER BRONCHOSCOPY.

BY G. HUDSON MAKUEN, M.D.

The inhalation of an open safety-pin is of rare occurrence, and I am unable to find in the literature any previous report of the removal of one from the trachea by this method. The patient, thirteen years of age, on the evening of May 9th, of the present year, while laughing with some other girls and at the same time holding this open safety-pin in her mouth, inhaled it, and, as the radiogram shows, it lodged in the trachea about midway between the cricoid cartilage and the sternal notch. The radiogram was taken the day following the accident, and after the family physician had endeavored to extract the pin with curved forceps. Even after examining the radiogram it was thought that the pin was probably in the esophagus, and the surgeons at the hospital to which the patient was taken made a blind and unsuccessful effort to remove it.

I saw the girl about twenty-four hours after the accident, and I was able to get a laryngoscopic picture of the large end of the pin presenting about three-quarters of an inch below the glottis. The patient being entirely comfortable except for a slight irritation during occasional spells of coughing, I postponed any attempt to remove the pin until the following afternoon, when, under chloroform anesthesia and with the Jackson tube and a special safety-pin device, I succeeded in getting it. The patient was put in bed, where she remained several days without any symptoms whatever which could be referable to the accident or to our operation for the removal of the foreign body. She did not lose a drop of blood, nor did she have any blood-tinged expectoration; and she has now entirely recovered from a marked catarrhal inflammation of the trachea which followed her unusual experience.

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REPORT OF A CASE OF PISTOL-SHOT WOUND OF THE NOSE.

BY ARTHUR AMES BLISS, M. D.

This case is such an unusual one that my brief report of it may be of interest.

On February 5th, of this year, W. U., a lad thirteen years of age, in company with other boys, trespassed on the freight yards of a railroad company in this city. An employe on guard gave the boys warning to leave the premises, and soon after the report of a pistol was heard. The guard denied having fired it. W. U. fell to the ground bleeding from a wound in his face. He did not lose consciousness, but soon got on his feet and walked to the Children's Hospital of the Mary J. Drexel Home. There the resident physician, Dr. Schaeffer, found a wound at the junction of the left cheek and left ala of the nose, about over the nasal process of the left superior maxilla, on a line about one-third of an inch above the floor of the vestibule of the left nostril. A probe led through this wound in a slightly upward and inward direction for a short distance, until its end impinged on a hard substance lodged in the right nasal chamber.

I saw the boy two days later. The external wound was then well advanced toward healing. There was a large perforation through the nasal septum, and a foreign body, resembling the edge of a mashed bullet, was seen in the right naris, imbedded in the outer wall of this nasal chamber at about the middle fossa. It had crushed in the lower part of the middle turbinated body and penetrated the antral wall.

Under cocaine I removed the ball through the right nostril, after loosening it from its not very secure hold in the antral wall. You will notice that the ball is much flattened. It was larger than the opening of the nostril. However, it was removed without difficulty. An X-ray plate had been made of the child's head at the time of the patient's application for treatment at the hospital. I show you a print from this plate with the ball *in situ*

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and, also, the ball itself. The case is unusual in many respects. I doubt if one just like it has been reported. That the 38-calibre

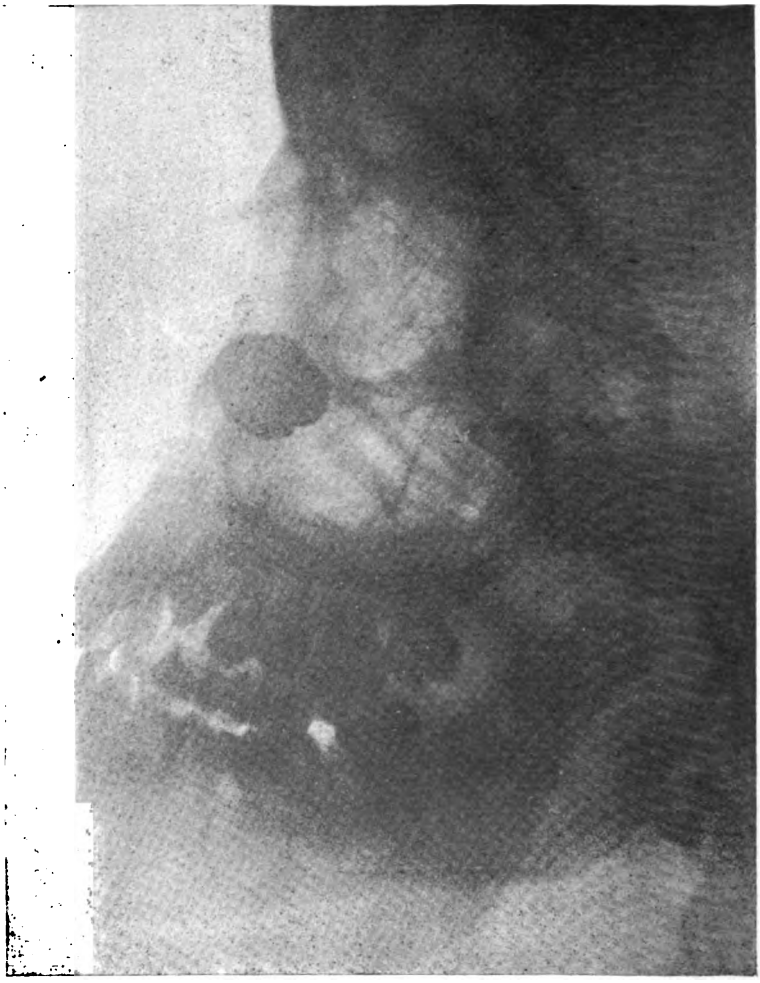

Fig. 1.
Pistol-Shot Wound of Nose.

ball lodged in such feebly resistant tissue as the inner wall of the antrum, after its passage through comparatively soft tissues,

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appears to indicate that the shot was not aimed at the patient, but must have struck some hard substance and been deflected to him after much of its force was spent. The boy made a satisfactory recovery. Only a faint scar marks the point of the external wound. The margins of the septal perforation healed rapidly, leaving a rather large perforation, but no external deformity of the nose or face. The antral wound healed and the boy appears to be none the worse for this peculiar experience.

Discussion on the Paper of Dr. Bliss.

Dr. Mackenzie: I would like to refer briefly to a remarkable case which came under my care some years ago. An officer in the Ninth Infantry when stationed at Madison Barracks, New York State, came to consult me concerning a deformity of the septum, with large perforation, which had followed an operation on that structure. I corrected the deformity as well as I could and he rejoined his regiment, which some time later was ordered with the rest of the American troops to China to assist in quelling the Boxer uprising. When his command reached Manila, he was taken with a low fever and confined to the hospital. He had just been advanced in rank for conspicuous gallantry at Santiago, and whether in alcoholic celebration of that event or as the result of the fever's delirium he had placed the muzzle of his pistol against his neck just above the thyroid cartilage in the centre line and fired. The ball went through the structures of the neck, the tongue, the palate and nose, and emerged from the forehead in the median line between and above the eyes without doing serious damage and with comparatively little loss of blood. As soon as he was able to travel he came back to consult me again. What had been done for him at Manila I am unable to say, but when he reached Baltimore complete healing had taken place and there was nothing left for me to do.

Dr. G. Hudson Makuen: I should like to add the report of a gun-shot wound that I think is quite as interesting and unusual as either of the two just mentioned. The accident happened to a negro man who had a very large and flat nose. He was shot during a street brawl, and the bullet passed through the left ala of the nose without inflicting any further injury.

Dr. T. Melville Hardie: I would like to mention a case that happened to a brother specialist in Chicago. The patient was shot at very close range in his consulting room. Among other injuries he received a shot through one of the alae of the nose, and in this case the bullet lodged in the other ala without injuring

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the septum. The bullet was not discovered for three weeks, and was then removed by Dr. Beck.

I only mention this case because Dr. Bliss seemed to think that in the case he reports the bullet could not have been aimed at the victim; in the case to which I refer the bullet was aimed at the victim at the distance of five feet.

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AMERICAN LARYNGOLOGICAL ASSOCIATION.

Business Meeting.

The Thirty-third Annual Congress of the American Laryngological Association met in Philadelphia under the presidency of Dr. D. Braden Kyle, on Monday, May 29, 1911. The opening session was held in the building of the Philadelphia College of Physicians on Monday, May 29, at 10 a. m. During the various sessions the following Active Fellows were in attendance:

Dr. John F. Barnhill, Indianapolis, Ind.
Dr. Herbert S. Birkett, Montreal, Canada.
Dr. Arthur A. Bliss, Philadelphia, Pa.
Dr. J. Price-Brown, Toronto, Canada.
Dr. Joseph H. Bryan, Washington, D. C.
Dr. William E. Casselberry, Chicago, Ill.
Dr. Walter F. Chappell, New York City.
Dr. J. Payson Clark, Boston, Mass.
Dr. Cornelius G. Coakley, New York City.
Dr. Lewis A. Coffin, New York City.
Dr. J. Solis-Cohen, Philadelphia, Pa.
Dr. Algernon Coolidge, Jr., Boston, Mass.
Dr. D. Bryson Delavan, New York City.
Dr. Walter J. Freeman, Philadelphia, Pa.
Dr. Richard Frothingham, New York City.
Dr. Albert C. Getchell, Worcester, Mass.
Dr. Joseph E. Gibb, Philadelphia, Pa.
Dr. Charles P. Grayson, Philadelphia, Pa.
Dr. T. Melville Hardie, Chicago, Ill.
Dr. Thomas J. Harris, New York City.
Dr. Jacob H. Hartman, Baltimore, Md.
Dr. Christian R. Holmes, Cincinnati, Ohio.
Dr. Frederic E. Hopkins, Springfield, Mass.

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Dr. Thomas Hubbard, Toledo, Ohio.
Dr. John M. Ingersoll, Cleveland, Ohio.
Dr. Chevalier Jackson, Pittsburg, Pa.
Dr. Samuel Johnston, Baltimore, Md.
Dr. D. Braden Kyle, Philadelphia, Pa.
Dr. George A. Leland, Boston, Mass.
Dr. Lorenzo B. Lockard, Denver, Colo.
Dr. James E. Logan, Kansas City, Mo.
Dr. Alexander W. MacCoy, Philadelphia, Pa.
Dr. John N. Mackenzie, Baltimore, Md.
Dr. G. Hudson Makuen, Philadelphia, Pa.
Dr. Emil Mayer, New York City.
Dr. Harris P. Mosher, Boston, Mass.
Dr. Robert C. Myles, New York City.
Dr. James E. Newcomb, New York City.
Dr. Francis R. Packard, Philadelphia, Pa.
Dr. Norval H. Pierce, Chicago, Ill.
Dr. B. Alexander Randall, Philadelphia, Pa.
Dr. J. Edwin Rhodes, Chicago, Ill.
Dr. George L. Richards, Fall River, Mass.
Dr. Charles W. Richardson, Washington, D. C.
Dr. John O. Roe, Rochester, N. Y.
Dr. Burt R. Shurley, Detroit, Mich.
Dr. William K. Simpson, New York City.
Dr. Greenfield Sluder, St. Louis, Mo.
Dr. Harmon Smith, New York City.
Dr. George C. Stout, Philadelphia, Pa.
Dr. Henry L. Swain, New Haven, Conn.
Dr. Clement F. Theisen, Albany, N. Y.
Dr. Allen B. Thrasher, Cincinnati, Ohio.
Dr. Arthur W. Watson, Philadelphia, Pa.
Dr. J. Gordon Wilson, Chicago, Ill.
Dr. George B. Wood, Philadelphia, Pa.

The first exercise on the morning's program was the presentation of a gavel to the association by Drs. Johnston, Hartman, Mackenzie and Delavan. The presentation address was made by Dr. Delavan, who spoke as follows:

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Mr. President and Fellows of the American Laryngological Association:

During the past year the idea occurred to one of us that a gift of a certain character might suggest to his fellow members some thoughts which he hoped would be impressed upon their minds. The form of the gift became concrete and we have it before us to-day.

Since the founders of this Association first met in conference just one generation ago loyalty and friendship have been the watchwords of the policy, the keynotes of its success. The incident which at this moment is bespeaking your attention had its inspiration in that idea.

This much-honored member of our circle has with infinite thoughtfulness and true artistic instinct caused to be made this gavel. He offers it as a gift to the Association, confidently hoping that it may meet with your acceptance in the same spirit in which it is tendered. The interest thus manifested by him is but an expression of the loyalty which he brought as a founder of our institution and which he has enthusiastically sustained toward it up to the present day.

What the gift is you see before you. Its practical usefulness as well as its intrinsic beauty are apparent. But it is in what it typifies, what it represents, that its chiefest interest lies.

Fashioned as it is this implement itself, like the hammer of Thor, is representative of force. So, in the hands of our chief officer, it indicates authority, the power to command. The ebony of which it is composed stands for strength, by means of which that authority can be executed; for endurance, suggestive of perpetuity. The gold represents purity and truth. The caduceus of Mercury, patron of Medicine, is the symbol of our splendid profession, its intertwined serpents typifying wisdom, the wings progress.

The presentation inscription suggests the loyalty of its members to this great Association, while the names graven into its substance eloquently typify the deep and abiding friendships which, begun in earlier years, have blossomed and grown and ripened until they have become worthy to take their places with

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the most precious of our treasures, the cherished possessions of our lives.

Thus and to all time may the meanings expressed by our gift be understood. May this gavel, Mr. President, ever be held by one equal to the dignity of his position and fully conscious of it!

May the hand that grasps it be a firm hand, wisely guided by a mind strong in its sense of justice and equity!

May the motives which actuate its rulings be as pure as refined gold!

May its decisions ring as true as silver!

May its serpents ever remind us that we of this Association, more than any others, need to exercise wisdom in the conduct of our affairs; its wings that upon us devolves supremely the necessity for progress, onward, forward, upward, in all that pertains to the best in science, in ethics and in the humanities!

Mr. President, in the name of its donors it is my privilege to present to the American Laryngological Association, through yourself, this gift, and with it the assurance of their own earnest loyalty to its interests and their abiding faith in its future.

May you and your successors cause it in no uncertain tones to ring out your decisions for the right through many a generation to come!

DR. SAMUEL JOHNSTON, OF BALTIMORE.

Mr. President and Fellows of the American Laryngological Association:

You have had pictured to you in the scholarly presentation address of Dr. Delavan the history of this gift and something of the spirit in which it is made. It is fitting, though, that I should briefly address you, if only to emphasize the pleasure it affords me to have you accept this token; and how grateful I am to be with you to-day, when many of that group of men who assembled at the inaugural meeting of the American Laryngological Association, at Buffalo, on the 3rd of June, 1878, have finished their earthly labors. The felicitous thought has come to me to present to you this gavel embellished with the caduceus of Hermes, symbolic of power, wisdom, diligence and activity.

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My pleasure is also to perpetuate the names of a group of friends whose companionship has added so greatly to the joys of my life. "One life reacts on another—its good increases the good in others."

> "So others shall
> Take patience, labor, to their heart and hand,
> From thy heart, and thy hand, and thy brave cheer,
> And God's grace fructify through thee to all.
> The least flower with a brimming cup may stand
> And share its dew-drop with another near."
> —Mrs. Browning.

Few workers in laryngology can hope to attain the fame of Louis Elsberg, J. Solis-Cohen, J. N. Mackenzie, D. Bryson Delavan, or equal in operative skill and scientific learning a host of others of your Fellows. But each one can do his part in solving the knotty problems in your specialty, the solution of which will redound to the distinction of this Association and to the relief of the sufferings of your fellow man. May this occasion mark an epoch in your history, from which will date unfailing success and continued prosperity!

Dr. John N. Mackenzie, of Baltimore.

Mr. President and Fellows of the American Laryngological Association:

I cannot allow this occasion to pass without one word of love and affection for the man who has just spoken to us words straight from his splendid heart. I have known him and his colleague, Dr. Hartman, in intimate association and friendly rivalry for thirty years, and I am thankful for this opportunity to state in public that during that time there has been no discordant note to mar the beautiful friendship existing between us, a friendship which will live in my memory throughout my life as a priceless recollection.

My friend Dr. Delavan has presented his speech with that rare and unfailing grace and felicity of expression that characterizes him, and I can but echo his words. I deem it a special privilege to have my name associated with this procedure, for as the years go by I rise to the realization and appreciation of the splendid work which he has done for this Association. In all

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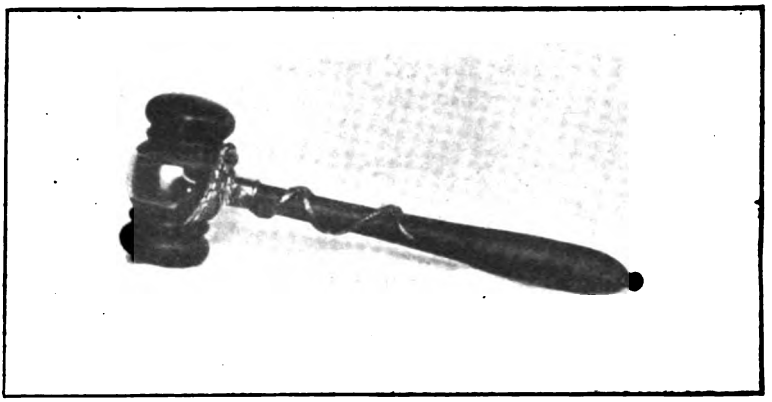
its membership none has been more mindful of its living and more faithful to its dead.

Johnston, Delavan and Hartman are types of the best that the profession of medicine affords.

Mr. President, what is said on this occasion will not be long remembered, and those of us who take part will in the nature of things be soon forgotten, but may we not hope that this incident and the lovely thought of our friend and fellow member may long remain with those who come after us as an enduring reminder of that which lies far beyond the reach of scientific skill, the human touch, the unselfish friendship, the depth and delicacy of sentiment which Dr. Johnston has so finely shown us? May it register a record on the souls and in the hearts of men!



The gavel was received on behalf of the association by the president, Dr. Kyle, who said:

DR. D. BRADEN KYLE, OF PHILADELPHIA.

Fellows of the American Laryngological Association:

On behalf of the Association I accept this gavel. Nothing more fitting could be presented to us, and the donors of it will always be remembered by their loyalty, faith and devotion to this Association.

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In behalf, then, of the Association I accept this gift. May it be as lasting as the good fellowship which has always existed among us!

Next in order followed the president's address by Dr. D. Braden Kyle.

An illustrated address was then delivered by Dr. George McClellan, professor of regional anatomy in Jefferson Medical College, upon the topic, "Regional Anatomy of the Upper Air Tract."

The papers were begun by the reading of Dr. Delavan of an abstract of a paper by Dr. Ingals, who was prevented by illness from being present. The foregoing exercises occupied all the forenoon, and at 12:45 p. m. the association went into executive session.

The first item of business was the election of new Fellows. For Active Fellowship there were two candidates, as follows: Dr. Lorenzo B. Lockard, Denver, Colo., proposed by Dr. Hubbard, seconded by Dr. Ingersoll. Thesis, "Epiglottidectomy, the Rational Treatment of Epiglottidean Tuberculosis," and Dr. George C. Stout, Philadelphia, Pa., proposed by Dr. Makuen, seconded by Dr. Packard. Thesis, "Syphilis of the Larynx." Dr. Stout also submitted some colored plates of Vincent's Angina from cases under recent observation. Drs. Clark and Hopkins acted as tellers and reported that thirty-seven votes had been cast, all in the affirmative. Drs. Lockard and Stout were thereupon declared elected as Active Fellows of the association.

Drs. Theisen and Getchell were appointed a committee to audit the books and accounts of the treasurer.

A nominating committee to nominate officers for the coming year was elected as follows: Dr. Birkett, chairman, and, in addition, Drs. Clark, Ingersoll, Simpson and Swain.

At 1 p. m. the Congress adjourned to the Racquet Club, where it enjoyed the hospitality at lunch of Dr. Grayson.

The scientific program was resumed at 2:30 p. m., and continued as far as time permitted. At 5 p. m. an adjournment was taken and Dr. and Mrs. Walter J. Freeman gave an "At Home"

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to the Fellows and ladies accompanying them at their residence, No. 1832 Spruce street.

In the evening a reception was given by the president and Mrs. Kyle to the Fellows, their ladies and a few friends at their country home, "The Maples," Falls Road, West Park, the guests being conveyed by motor cars. The grounds of "The Maples" were brilliantly illuminated, and with music, refreshments and conversation, the evening was greatly enjoyed by all.

Second Day, Tuesday, May 30th.

The Congress met at 9 a. m. and went at once into executive session. The first item of business was the reading and acceptance of the secretary's report, which herewith follows:

Secretary's Annual Report.

During the year now closing there have been no deaths in the association. Two active fellows have resigned, Dr. Lefferts retired from practice and Dr. Hyatt from prolonged and continued ill-health. Deducting these two names and adding those of the gentlemen elected at the present congress, the list of members stands numerically the same as one year ago, viz.: Honorary 6, with 10 vacancies; corresponding 22, with 8 vacancies, and active 87, with 13 vacancies.

The Transactions of 1910 appeared on October 15 of that year. A few copies have been sold at $2.65 each, the net cost delivered to the association. The Netherland National Society has been added to the permanent mailing list.

There have been two meetings of the Council and the minutes will now be read.

Under date of June 9, 1910, the secretary was in receipt of the following letter:

James T. Newcomb, M.D., 118 West 69th street, New York:

Dear Dr. Newcomb:—For some time past I have had the desire in mind to bequeath to the American Laryngological Association the sum of five thousand dollars ($5,000). I have corresponded with Dr. Delavan regarding the advisability of making such a bequest and also consulted my lawyer. The only way that

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the association could be sure of receiving this sum would be for the society to take out papers of incorporation. I shall be glad to have you co-operate with the Council regarding this step. Dr. Delavan is most enthusiastic over the possibilities of great future benefit to the prosperity and efficiency of the association if it can be arranged that this gift can be received. I shall be glad if you can see Dr. Delavan at your convenience and talk the matter over. In the meantime I will put the bequest on record, trusting that we may have plenty of time to arrange details. With the kindest regards, believe me always.

Yours most cordially,

(Signed) SAMUEL JOHNSTON.

Baltimore, June 9, 1910.

The action taken by the Council at its meeting of January 14 you have heard read. A postal card vote resulted in more than three-fourths of the Active Fellowship in favor of incorporation, and the secretary was directed to proceed therewith. The matter of details was left to his judgment. The matter was placed in the hands of Mr. John C. Coleman, attorney-at-law, 100 Broadway, New York City, the result of whose labors is seen in the following:

Certificate of Incorporation.

We, the undersigned, all being of full age and all citizens of the United States and of the State of New York, and residents of said State, desiring to form a corporation, pursuant to the provisions of the membership corporation law and of the general corporation law, do hereby certify, sign, declare, acknowledge and file this certificate for that purpose, as follows:

First—That the particular object for which the corporation is to be formed is for the promotion of knowledge in all that relates to diseases of the upper air passages of the human body.

Second—That the name of the proposed corporation is the American Laryngological Association.

Third—That the territory in which its operations are to be conducted is in the City of New York, and also in the other cities of the United States and of the Dominion of Canada.

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Fourth—That its principal office is to be located in said City of New York and County of New York.

Fifth—That the number of directors of the corporation shall be ten.

Sixth—That the names and places of residence of the persons to be its directors until its first annual meeting are:

NAMES.	PLACES OF RESIDENCE.
D. BRADEN KYLE, M. D.	1517 Walnut street, Philadelphia, Pa.
D. BRYSON DELAVAN, M. D.	1 East 33d street, New York, N. Y.
ROBERT C. MYLES, M. D.	46 West 38th street, New York, N. Y.
JOHN M. INGERSOLL, M. D.	1021 Prospect street, Cleveland, O.
JOSEPH H. BRYAN, M.D.	818b 17th street, Washington, D. C.
HERBERT S. BIRKETT, M.D.	252 Mountain street, Montreal, Can.
A. W. DE ROALDES, M.D.	624 Gravier street, New Orleans, La.
A. COOLIDGE, JR., M.D.	613 Beacon street, Boston, Mass.
JAMES E. LOGAN, M.D.	1208 Wyandotte street, Kansas City, Mo.
JAMES E. NEWCOMB, M.D.	118 W. 69th street, New York, N.Y.

Seventh—The time for holding the annual meeting of said corporation shall be on the second Saturday after the first day of January in each year.

In witness whereof we have made, signed and acknowledged this certificate in duplicate this 16th day of March, 1911.

(Signed)

D. BRYSON DELAVAN, 1 E. 33d St., New York, N. Y.
ROBERT C. MYLES, 48 W. 36th St., New York, N. Y.
JAMES F. MCKERNON, 62 W. 52d St., New York, N. Y.
CORNELIUS G. COAKLEY, 53 W. 56th St., New York, N. Y.
JAMES E. NEWCOMB, 118 W. 69th St., New York, N. Y.

State of New York, }
County of New York. } ss.:

On this 16th day of March before me personally appeared D. Bryson Delavan, Robert C. Myles, James F. McKernon, Cornelius G. Coakley and James E. Newcomb, to me known and known to me to be the individuals described in and who exe-

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cuted the foregoing certificate, and they severally acknowledged that they executed the same for the purpose therein stated.

GEORGE W. THOMAS,
Notary Public, Kings County.

Certificate filed in New York County.

State of New York,
Office of Secretary of State.

I have compared the preceding with original certificate of incorporation of the American Laryngological Association, filed and recorded in this office on the 18th day of March, and do hereby certify the same to be a correct transcript therefrom and of the whole of said original.

Witness my hand and the seal of office of the Secretary of State, at the city of Albany, this 21st day of March, 1911.

JOSE E. PIELGEEN,
Second Deputy Secretary of State.

I, a Justice of the Supreme Court, of the State of New York, of the First Judicial Department, do hereby approve the within certificate of incorporation and consent that the same be filed.

CHARLES L. GUY,
Justice Supreme Court, State of New York.

State of New York,
Office of Secretary of State.

Filed and recorded March 18, 1911.

EDWARD LAZANSKY,
Secretary of State.

There are no further matters calling for special mention in the Secretary's report.

To the Fellows of the American Laryngological Association:

Gentlemen—For eleven successive years you have deemed me worthy of serving as your secretary and treasurer. The time has now come when I must ask to be relieved. Certain physical

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symptoms have appeared during the last two years which impel me to take this precautionary step, and it has been directed by my medical adviser. I cannot begin to enumerate the acts of courtesy and forbearance I have received at your hands. For them I am more grateful than I can well express. I hope to meet with you many more years in annual congress, but the immediate management which has been mine for so long a time will fall to others. Let me but reiterate my feeling of loyalty toward the association and my desire to serve it in every way possible.

This report is respectfully submitted.

(Signed) JAMES E. NEWCOMB, M.D., Secretary.

Annual report of the treasurer for the year ending May 30, 1911.

RECEIPTS.

Balance from old account	$446.39
Sale dinner tickets 1910	240.00
Loan Corn Exchange Bank	400.00
Arrears of dues	50.00
Dues for 1911	800.00
Sale transactions	26.70
Color illustrating (paid by Fellow)	55.00
Exchange on checks	.15
Total	$2,018.24

EXPENDITURES.

Paid annual dinner 1910	$263.75
Stenographer congress, 1910	103.00
Repayment bank loan	400.00
Interest on loan	8.40
Transactions, 1910	620.80
Programmes and distribution, 1911	49.75
Printing, stationery and postage	45.25
Paid Newton M. Shaffer, treasurer Triennial Congress, 1910, this association's share of the deficit of the congress	73.96

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Expenses of incorporation	53.26
Office expenses secretary and treasurer	28.22
Total	$1,646.39
Balance to new account	371.85
	$2,018.24

STATEMENT ASSETS AND LIABILITIES.

Assets—Invested—De Roaldes Prize Fund and accrued interest as per account No. 202,169, Franklin Savings Bank, New York City, in name of treasurer	$571.49
Current—Unpaid dues	120.00
Postage in office	2.26
Bank balance	371.85
Total current assets	$394.11

LIABILITIES NONE.

Respectfully submitted,

JAMES E. NEWCOMB,
Treasurer.

Philadelphia, May 30, 1911.

Audited and found correct.

(Signed) C. F. THEISEN,
A. C. GETCHELL,
Auditing Committee.

Report of the Librarian.

Your librarian has to report that since the last meeting of the association thirty-four additions have been made to the library, of which twenty-seven are pamphlets and seven bound books. These books and pamphlets have been placed in the library of the association—in the library of the Surgeon-General of the United States Army. Respectfully,

J. H. BRYAN, Librarian.

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The Nominating Committee presented the following ticket:

For President, Dr. Newcomb.
First Vice-President, Dr. Cobb.
Second Vice-President, Dr. B. R. Shurly.
Secretary and Treasurer, Dr. Smith.
Librarian, Dr. Bryan.
Member of Council, to serve for four years, Dr. Kyle.
Delegate to the Triennial Congress, Dr. Simpson.
Alternate, Dr. Bryan.

The committee on the de Roaldes Prize Fund reported through Dr. Delavan, the other members of the committee being Dr. Farlow, chairman, and Dr. Casselberry. The report was as follows:

THE DE ROALDES PRIZE.

The object of this prize shall be to advance the sciences of Laryngology and Rhinology in the United States and Canada.

The prize shall consist of a medal, to be known as the De Roaldes prize medal.

It shall be awarded triennially for the best essay on some subject relating to Laryngology or Rhinology.

The competition shall be open to practitioners in regular standing of the United States and Canada not members of the American Laryngological Association.

The essays shall be in English and typewritten. They shall be placed in the hands of the Secretary of the American Laryngological Association on or before a previously announced date, the customary measures being taken to prevent disclosure of the author's name.

A committee of three shall be appointed by the president of the American Laryngological Association to serve as judges. The committee is to give preference to essays offering new suggestions of practical value, especially if growing out of original work.

The successful essay is to be published in the Transactions of the American Laryngological Association, but the author shall

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be allowed to publish the essay at his discretion, as soon as the prize shall have been awarded.

Regarding the actual design of the medal itself the following letter was submitted:

TIFFANY & CO.

Fifth Avenue and Thirty-seventh Street, New York.

May 25, 1911.

Dr. D. Bryson Delavan,

1 East 33d St., New York City.

Dear Sir—We return herewith the design for medal left with our Mr. Whitehouse, and estimate the cost of cutting the dies, as per this design, for a medal 1 7-8 inches in diameter, at $175. We can furnish an 18 carat gold medal of this diameter, and the thickness represented in the accompanying outline sketch, for $50, which price is inclusive of a suitable case. We will have an inset for the name and date. Awaiting your further pleasure, we are, respectfully,

TIFFANY & CO.,
Per W. H. P.

It was voted to continue the committee for another year and it was authorized to prepare the medal according to the designs already adopted and the estimates secured. It was also voted that the expense of the dies should be met by the association, and the committee was authorized to draw upon the treasurer to the amount of $175.

The report of the Committee on Revision of the Constitution was presented by the chairman, Dr. Coakley. It was discussed by sections and finally adopted as the committee report. Action thereon was deferred for one year as required by Article 8 of the present constitution.

The Congress then listened to the paper of Dr. J. Solis-Cohen, and at 1 p. m. adjourned to the Hotel Rittenhouse, where, with their ladies, they were entertained at lunch, tendered by the Philadelphia Fellows. At 2:30 p. m. the sessions were resumed at the college.

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In the evening the annual banquet was held at the Bellevue-Stratford. Forty-four Fellows were in attendance, and Dr. George McClellan as the guest of the association.

Third Day, Wednesday, May 31st.

The Congress met at 9:30 for its closing session. The reading of papers was concluded and the following resolution was offered by Dr. Richards:

Resolved, That the president appoint a committee of three or five for the collective investigation of the subject of the tonsil, to study the non-operated tonsil, its physiology and its relation physiologically and pathologically to the rest of the body; to study the operated tonsil and the results after tonsillotomy and tonsillectomy, including the technique and the sequelae; no case to be presented in which the history cannot be given for at least three years after the first observation or after operation, if made; the reports are to be solicited from the members of the special societies throughout the world and from leading general practitioners and surgeons and ten cases from each if possible; the report to be made in one or two years when made and to include all the tonsil problems; this to be published as a monograph by the association and for general sale."

It was voted to refer the resolution to the council with power.

The following resolutions were then adopted:

Resolved, That the treasurer be and hereby is authorized to borrow funds not to exceed five hundred dollars to assist in defraying the expense of publishing the Transactions of the present Congress.

Resolved, That the Association hereby tenders to the governors of the Philadelphia College of Physicians its sincere thanks for and appreciation of the hospitality extended to it during the sessions of the present Congress.

Resolved, That we hereby express to the Philadelphia Fellows our sincere appreciation of their hospitality extended so lavishly during the last three days.

Resolved, That we especially desire to thank Dr. Kyle for the able and impartial manner in which he has presided over the

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deliberations during the sessions now closing, and that we extend to him and to Mrs. Kyle an expression of our hearty appreciation of their boundless hospitality.

There being no further business except the election of the officers for the ensuing year, according to the report presented by the Nominating Committee, the report was again read, and it was voted that Dr. Delavan cast one affirmative ballot. This was done and the gentlemen named were declared elected. Dr. Kyle retired and Dr. Newcomb assumed the office of president, and at 1:15 p. m. declared the Congress adjourned.

JAMES E. NEWCOMB, Secretary.

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ACTIVE FELLOWS.

1912.

1906. BALLENGER, WILLIAM L., Columbus Memorial Building, Chicago, Ill.
1908. BARNHILL, JOHN F., 328 Delaware St., Indianapolis, Ind.
1880. BEAN, C. E., Germania Life Bldg., St. Paul, Minn.
1904. BERENS, T. PASSMORE, 35 Park Ave., New York.
1893. BIRKETT, HERBERT S., 252 Mountain St., Montreal.
1893. BLISS, ARTHUR AMES, 117 South 20th st., Philadelphia, Pa.
1878. BOSWORTH, FRANCKE H., 41 Park Ave., New York.
1901. BROWN, J. PRICE, 28 College St., Toronto, Can.
1892. BROWN, MOREAU R., 34 Washington St., Chicago, Ill.
1891. BRYAN, JOSEPH H., 818 17th St., Washington, D. C.
1889. CASSELBERRY, WILLIAM E., 34 Washington St., Chicago, Ill.
1896. CHAPPELL, WALTER F., 7 East 55th St., New York.
1897. CLARK J. PAYSON, 71 Marlborough St., Boston, Mass.
1902. COAKLEY, CORNELIUS G., 53 West 56th St., New York.
1899. COBB, FREDERIC C., 11 Marlborough St., Boston, Mass.
1905. COFFIN, LEWIS A., 156 West 58th St., New York.
1878. COHEN, J. SOLIS, 1824 Chestnut St., Philadelphia, Pa.
1893. COOLIDGE, ALGERNON, JR., 613 Beacon St., Boston, Mass.
1882. DEBLOIS, THOMAS AMORY, 48 Gloucester St., Boston, Mass.
1881. DELAVAN, D. BRYSON, 1 East 33d St., New York.
1892. FARLOW, JOHN W., 234 Clarendon St., Boston, Mass.
1901. FREEMAN, WALTER J., 1832 Spruce St., Philadelphia, Pa.
1905. FREER, OTTO T., 34 Washington St., Chicago, Ill.
1879. FRENCH, THOMAS R., 150 Joralemon St., Brooklyn, N. Y.
1879. FROTHINGHAM, RICHARD, 616 Madison Ave., New York.
1909. GETCHELL, ALBERT, C., 6 Linden St., Worcester, Mass.
1907. GIBB, JOSEPH S., 1907 Chestnut St., Philadelphia, Pa.
1880. GLEITSMANN, JOSEPH W., 616 Madison Ave., New York.

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1898. GOODALE, JOSEPH L., 258 Beacon St., Boston, Mass.
1905. GRAYSON, CHARLES P., 251 South 16th St., Philadelphia, Pa.
1906. GREENE, D. CROSBY, JR., 483 Beacon St., Boston, Mass.
1905. HALSTEAD, THOMAS H., 831 University Block, Syracuse, N. Y.
1896. HARDIE, T. MELLVILLE, 34 Washington St., Chicago, Ill.
1903. HARRIS, THOMAS J., 117 East 40th St., New York.
1878. HARTMAN, JACOB H., 5 West Franklin St., Baltimore, Md.
1888. HINKEL, F. WHITEHILL, 581 Delaware Ave., Buffalo, N. Y.
1907. HOLMS, CHRISTIAN R., 8 East 8th St., Cincinnati, Ohio.
1893. HOPE, GEORGE B., 159 West 72d St., New York.
1895. HOPKINS, FREDERICK E., 25 Harrison Ave., Springfield, Mass.
1895. HUBBARD, THOMAS, 544 Nicholas Building, Toledo, Ohio.
1878. INGALS, E. FLETCHER, 15 East Washington St., Chicago, Ill.
1904. INGERSOLL, JOHN M., 1021 Prospect Ave., Cleveland, Ohio.
1907. JACKSON, CHEVALIER, 1018 Westinghouse Building. Pittsburg Pa.
1878. JOHNSTON, SAMUEL, 204 West Monument St., Baltimore, Md.
1885. KNIGHT, CHARLES H., the St. Hubert, 120 West 57th St., New York.
1898. KYLE, D. BRADEN, 1517 Walnut St., Philadelphia, Pa.
1880. LANGMAID, SAMUEL W., 277 Dartmouth St., Boston, Mass.
1894. LELAND, GEORGE A., 354 Commonwealth Ave., Boston, Mass.
1903. LINCOLN, WILLIAM, 210 Lennox Bldg., Cleveland, Ohio.
1897. LOGAN, JAMES E., 1208 Wyandotte St., Kansas City, Mo.
1888. LOWMAN, JOHN H., 1807 Prospect Ave., S. E., Cleveland. Ohio.
1911. LOCKARD, LORENZO B., Metropolitan Bldg., Denver, Col.
1886. MACCOY, ALEXANDER W., 216 South 15th St., Philadelphia, Pa.
1883. MACKENZIE, JOHN N., 605 Washington Place, Baltimore, Md.

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1898. MAKUEN, G. HUDSON, 1627 Walnut St., Philadelphia, Pa.
1896. MAYER, EMIL, 40 East 41st St., New York.
1899. MCKERNON, JAMES F., 62 West 52d St., New York.
1904. MOSHER, HARRIS P., 828 Beacon St., Boston, Mass.
1901. MYLES, ROBERT C., 46 West 38th St., New York.
1893. NEWCOMB, JAMES E., 118 West 69th St., New York.
1903. PACKARD, FRANCIS R., 304 South 19th St., Philadelphia, Pa.
1906. PIERCE, NORVAL H., 31 Washington St., Chicago, Ill.
1878. PORTER, WILLIAM, 3886 Washington Ave., St. Louis, Mo
1908. RANDALL, B. ALEXANDER, 1717 Locust St., Philadelphia, Pa.
1903. RENNER, W. SCOTT, 341 Linwood Ave., Buffalo, N. Y.
1897. RHODES, J. EDWIN, People's Gas Building, Chicago, Ill.
1884. RICE, CLARENCE C., 123 East 19th St., New York.
1905. RICHARDS, GEORGE L., 84 North Main St., Fall River, Mass.
1902. RICHARDSON, CHARLES W., 1317 Connecticut Ave., Washington, D. C.
1893. ROALDES, ARTHUR W. DE, 624 Gravier St., New Orleans, La.
1879. ROE, JOHN O., 44 Clinton Ave., South Rochester, N. Y.
1907. SHAMBAUGH, GEORGE E., People's Gas Building, Chicago, Ill.
1909. SHURLY, BURT R., 32 Adams Ave. W., Detroit, Mich.
1878. SHURLY, ERNEST L., 32 Adams Ave. W., Detroit, Mich.
1909. SLUDER, GREENFIELD, 3542 Washington Ave., St. Louis, Mo.
1892. SIMPSON, WILLIAM K., 952 Lexington Ave., New York.
1908. SMITH, HARMON, 44 West 49th St., New York.
1911. STOUT, GEORGE C., 1611 Walnut St., Philadelphia, Pa.
1889. SWAIN, HENRY L., 232 York St., New Haven, Conn.
1903. THEISEN, CLEMENT F., 172 Washington Ave., Albany, N. Y.
1892. THRASHER, ALLEN B., The Groton, 7th and Race Sts., Cincinnati, Ohio.
1892. WAGNER, HENRY L., 2303 Bush St., San Francisco, Cal.
1892. WATSON, ARTHUR W., 126 South 18th St., Philadelphia, Pa.

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1908. WILSON, J. GORDON, 5221 Hibbard Ave., Chicago, Ill.
1906. WINSLOW, JOHN R., 114 West Franklin St., Baltimore, Md.
1905. WOOD, GEORGE B., 129 South 18th St., Philadelphia, Pa.
1890. WRIGHT, JONATHAN, N. Y. Post Grad. Med. School and Hospital.

HONORARY FELLOWS.

1910. CHIARI, OTTOKAR, Bellariastrasse 12, Vienna, Austria.
1910. MASSEI, F, 4 Piazza Municipio, Naples, Italy.
1910. MOURE, E. J., 25 Cours du Jardin Public, Bordeaux, France.
1909. SEMON, FELIX, Rignall, Great Missenden, Bucks, England.

CORRESPONDING FELLOWS.

1880. BRUNS, PAUL, Tübingen, Wurtemberg, Germany.
1901. COLLIER, MAYO, 145 Harley St., Cavendish Square, London W., England.
1890. DE LA SOTA Y LASTRA, R., 7 Calle de Torqueros, Seville, Spain.
1893. DESVERNINE, C. M., Cuba 52, Havana, Cuba.
1901. GRANT, DUNDAS, 18 Cavendish Square, London W., England.
1902. HEYMANN, PAUL, 60 Lützowstrasse, Berlin W., Germany.
1908. KILLIAN, GUSTAV, Freiburg-im-Breisgau, Germany.
1892. KRAUSE, H., San Remo, Italy.
1902. LERMOYEZ, MARCEL, 20 Rue de la Boetie, Paris, France.
1897. LUC, H., 54 Rue de Varenne, Paris, France.
1903. MCBRIDE, P., 16 Chester St., Edinburgh, Scotland.
1896. MACDONALD, GREVILLE, 85 Harley St., Cavendish Square, London W., England.
1894. MACINTYRE, JOHN, 179 Bath St., Glasgow, Scotland.
1896. MYGIND, HOLGER, 31 Havnegade, Copenhagen, Denmark.
1901. NATIER, MARCAL, 12 Rue Caumartin, Paris, France.
1910. NAVRATIL, EMERICH VON, IV Yaaczi-utcza 40, Buda-Pesth, Hungary.
1903. ONODI, A., o'Uctza, 12, Buda-Pesth, Hungary.

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1910. RETHI, LEOPOLD, IX Garnisongasse 7, Vienna, Austria.
1894. SAJOUS, C. E., 2043 Walnut St., Philadelphia, Pa.
1896. SCHMIEGELOW, ERNEST, 18 Nörregade, Copenhagen, Denmark.
1902. THOMSON, ST. CLAIR, 28 Queen Anne St., Cavendish Square, London W., England..
1903. TILLEY, HERBERT, 72 Harley St., Cavendish Square, London W., England.
1901. WINGRAVE, WYATT, 11 Devonshire St., Portland Place, London W., England.
1894. WOLFENDEN, R. NORRIS, 76 Wimpole St., Cavendish Square, London W., England.

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PAST OFFICERS.

Presidents.

(Year of Election.)

1879. Louis Elsberg.
1880. J. Solis-Cohen.
1881. F. I. Knight.
1882. G. M. Lefferts.
1883. F. H. Bosworth.
1884. E. L. Shurly.
1885. Harrison Allen.
1886. E. Fletcher Ingals.
1887. R. P. Lincoln.
1888. E. C. Morgan.
1889. J. N. Mackenzie.
1890. W. C. Glasgow.
1891. S. W. Langmaid.
1892. M. J. Asch.
1893. D. B. Delavan.
1894. J. O. Roe.
1895. W. H. Daly.
1896. C. H. Knight.
1897. T. R. French.
1898. W. E. Casselberry.
1899. Samuel Johnston.
1900. H. L. Swain.
1901. J. W. Farlow.
1902. J. H. Bryan.
1903. J. H. Hartman.
1904. C. C. Rice.
1905. J. W. Gleitsmann.
1906. A. W. de Roaldes.
1907. H. S. Birkett.
1908. A. Coolidge, Jr.
1909. J. E. Logan.
1910. D. Braden Kyle.

Vice-Presidents.

1879. F. H. Davis.
1880. W. C. Glasgow, J. O. Roe.
1881. E. L. Shurly, W. Porter.
1882. C. Seiler, E. F. Ingals.
1883. S. W. Langmaid, S. Johnston.
1884. J. H. Hartman, W. H. Daly.
1885. H. A. Johnson, G. W. Major.
1886. E. C. Morgan, J. N. Mackenzie.
1887. J. N. Mackenzie, S. W. Langmaid.
1888. W. C. Glasgow, C. E. Sajous.
1889. E. Holden, C. E. Bean.
1890. J. O. Roe, J. H. Hartman.

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1891. M. J. Asch, S. Johnston.
1892. S. Johnston, J. C. Mulhall.
1893. J. C. Mulhall, W. E. Casselberry.
1894. C. C. Rice, S. H. Chapman.
1895. J. Wright, A. W. de Roaldes.
1896. T. M. Murray, D. N. Rankin.
1897. A. W. MacCoy, H. S. Birkett.
1898. J. W. Farlow, F. W. Hinkel.
1899. T. A. DeBlois, M. R. Brown.
1900. H. L. Wagner, A. A. Bliss.
1901. J. W. Gleitsmann, D. Braden Kyle.
1902. G. A. Leland, T. Melville Hardie.
1903. J. H. Lowman, W. Peyre Porcher.
1904. Thomas Hubbard, W. J. Freeman.
1905. J. L. Goodale, C. W. Richardson.
1906. G. H. Makuen, A. B. Thrasher.
1907. J. P. Clark, J. E. Rhodes.
1908. E. Mayer, F. R. Packard.
1909. C. G. Coakley, H. P. Mosher.
1910. Robert C. Myles, J. M. Ingersoll.

Secretaries and Treasurers.

1879. G. M. Lefferts.
1882. D. B. Delavan.
1889. C. H. Knight.
1895. H. L. Swain.
1900. J. E. Newcomb.

Librarians.

1879. F. H. Bosworth.
1883. T. R. French.
1903. J. H. Bryan.

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PAST MEMBERS.

Honorary Fellows.

*1880. Senor Manuel Garcia, London, England.
*1883. Sir Morell Mackenzie, London, England.
*1907. Leopold von Schroetter, Vienna, Austria.
*1904. B. Fraenkel, Berlin, Germany.

Corresponding Fellows.

*1892. Lennox Browne, London, England.
*1887. A. Gouguenheim, Paris, France.
*1894. Edgar Holden, Newark, N. J.
*1881. Carlo Labus, Milan, Italy.
*1880. Wilhelm Meyer, Copenhagen, Denmark.
*1901. Moritz Schmidt, Frankfort-a-Main, Germany.
*1881. Pugin Thornton, London, England.
*1881. R. Voltolini, Breslau, Germany.
*1880. W. McNeil Whistler, London, England.
‡1881. Sir Felix Semon, Bucks Co., England.
‡1887. E. J. Moure, Bordeaux, France.
‡1892. F. Massei, Naples, Italy.
‡1896. Ottokar Chiari, Vienna, Austria.

Active Fellows.

*1880. Harrison Allen, Philadelphia, Pa.
*1878. Morris J. Asch, New York.
1895. J. E. Boylan, Cincinnati, Ohio.
*1883. C. W. Chamberlain, Hartford, Conn.
*1882. S. Hartwell Chapman, New Haven, Conn.
1884. S. Solis-Cohen, Philadelphia, Pa.
1880. E. W. Cushing, Boston, Mass.
1878. Ephraim Cutter, West Falmouth, Mass.

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*1880. W. H. Daly, Pittsburg, Pa.
*1878. F. H. Davis, Chicago, Ill.
*1901. E. T. Dickerman, Chicago, Ill.
*1878. Frank Donaldson, Baltimore, Md.
*1878. William Carr Glasgow, St. Louis, Mo.
† 1879. Edgar Holden, Newark, N. J.
*1882. Franklin H. Hooper, Boston, Mass.
1882. Frank L. Ives, New York City.
*1878. Hosmer A. Johnson, Chicago, Ill.
*1879. Woolsey Johnson, New York City.
*1880. William C. Jarvis, New York City.
1879. R. H. Kealhofer, St. Louis, Mo.
*1901. Gordon King, New Orleans, La.
*1878. Rufus P. Lincoln, New York City.
1881. G. W. Major, Montreal, Canada.
1879. Charles McBurney, New York City.
1885. H. Clinton McSherry, Baltimore, Md.
*1881. E. C. Morgan, Washington, D. C.
*1886. J. C. Mulhall, St. Louis, Mo.
1892. T. Morris Murray, Washington, D. C.
*1881. H. Mynter, Buffalo, N. Y.
*1895. J. E. H. Nichols, New York City.
1879. H. K. C. Oliver, Boston, Mass.
1894. William H. Park, New York City.
1892. W. Peyre Porcher, Charleston, S. C.
*1880. D. N. Rankin, Allegheny, Pa.
1881. J. M. Robertson, Detroit, Mich.
1878. Beverly Robinson, New York City.
*1878. T. F. Rumbold, St. Louis, Mo.
† 1880. Charles E. Sajous, Paris, France.
*1879. Carl Seiler, Scranton, Pa.
*1893. Charles M. Shields, Richmond, Va.
1879. Andrew H. Smith, Geneva, N. Y.
1879. Bernhard Tauber, Cincinnati, Ohio.
*1899. Max Thorner, Cincinnati, Ohio.
1888. S. O. Van der Poel, New York City.
1878. Clinton Wagner, New York City.

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1896. Marshall R. Ward, Pittsburg, Pa.
1879. Whitfield Ward, New York City.
*1886. Benjamin F. Westbrook, Brooklyn, N. Y.
1896. Green V. Woollen, Indianapolis, Ind.
1878. George M. Lefferts, New York City.
1901. Franck Hyatt, Washington, D. C.

*Deceased. †Corresponding Fellow. ‡Honorary Fellow.

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